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REPORT OF THE PROCEEDINGS

OF THE

GEOLOGICAL AND POLYTECHNIC SOCIETY

OF THE

WEST-RIDING OF YORKSHIRE.

1869.

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Contents.

	PAGE
MEETING AT WAKEFIELD, April 28th, 1869	1
"ON CERTAIN NATURAL PITS IN THE NEIGHBOURHOOD OF RIPON," by the Rev. John Stanley Tute, of Markington	2
"REMARKS ON THE EXTINCT FAUNA OF THE EAST RIDING OF YORKSHIRE," by Mr. Edward Tindall, of Bridlington	7
"ON A NEW CARBONIFEROUS LABYRINTHODONT FROM THE NEIGHBOURHOOD OF BRADFORD," by Mr. Louis C. Miall, Curator of the Bradford Philosophical Society	15
"ON THE OCCURRENCE OF FLINT IMPLEMENTS AT ADEL, NEAR LEEDS, WITH SUGGESTIONS AS TO THE PROBABLE PERIOD OF THEIR DEPOSIT," by Henry Denny, A.L.S.	24
MEETING AT PONTEFRACT, November 4th, 1869	36
"ON THE ROCKS OF THE NEIGHBOURHOOD OF PONTEFRACT; WITH SOME OBSERVATIONS ON THE DISCOVERY OF SOME BONES OF THE BOS PRIMIGENIUS (LONG-FRONTED OR SHORT-HORNED OX)," by Mr. T. W. Tew, of Carleton	39
"ANCIENT BATTLEFIELDS IN THE SOUTHERN PORTION OF NORTH HUMBERLAND; SHOWING HOW PONTEFRACT OBTAINED ITS PRESENT NAME," by Rev. Scott F. Surtees, Rector of Sprotbrough	57
"ON THE STONE AVENUES OF CARNAC, AND OTHER PRE-HISTORIC MONUMENTS OF BRITTANY," by Rev. W. C. Lukis, M.A., F.S.A.	85
"ON THE BRIDLINGTON FLINT IMPLEMENTS," by J. Ffooks, Esq.	99

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UNITED STATES OF AMERICA.

PROCEEDINGS

OF THE

GEOLOGICAL AND POLYTECHNIC SOCIETY

Of the West-Riding of Yorkshire,

AT THE SEVENTY-THIRD MEETING, HELD IN THE LECTURE-ROOM OF THE CHURCH INSTITUTE, AT WAKEFIELD, ON WEDNESDAY, APRIL 28TH, 1869.

Dr. HOLDSWORTH (Mayor of Wakefield) in the Chair.

The Chairman having briefly alluded to the origin of the Society at Wakefield, and welcomed the members to the town on the present occasion,

The following gentlemen were unanimously elected members of the Society:—Dr. Holdsworth, of Wakefield; the Rev. Scott F. Surtees, Rector of Sprotburgh; Sir Charles Lowther, Bart., of Swillington House; T. W. Tew, of Carlton Villa, Pontefract; Stephen Seal, of Goldthorpe Hall, Darfield.

The accounts of the Society for the past year were then read, and the officers and committee appointed, as follows:—

STATEMENT OF RECEIPTS AND EXPENDITURE

OF THE GEOLOGICAL AND POLYTECHNIC SOCIETY OF THE WEST-RIDING OF YORKSHIRE.

From October, 1867, to October, 1868.

DR.	£.	s.	d.
By 2 Subscriptions for 1866....	1	6	0
,, 84 ,, 1867....	54	12	0
,, 13 ,, 1868....	8	9	0
	£64	7	0

CR.	£.	s.	d.
By Printing and Advertising ..	18	19	0
,, Philosophical Society for Rent of Museum Rooms ..	10	0	0
,, Collecting Subscriptions	1	10	7
,, Postages	1	8	5
,, Expenses of Meetings	0	14	3
,, Carriage of Parcels and Reports	0	5	9
,, Subscription to the Palæontographical Society	1	1	0
,, Lithographing Plates for Reports	2	3	0
,, Purchase of Sections and Diagrams.....	1	8	0
,, Photographs of Ancient Crosses	0	6	0
,, Stationery	0	2	6
,, General Secretary on Account	26	8	6
	£64	7	0

President.

THE EARL DE GREY AND RIPON.

Vice-Presidents.

THE DUKE OF NORFOLK.
THE DUKE OF LEEDS.
THE EARL OF EFFINGHAM.
THE EARL OF HAREWOOD.
THE EARL OF DARTMOUTH.
THE EARL FITZWILLIAM.
LORD WHARNCLIFFE.
LORD LONDESBOROUGH.
VISCOUNT HALIFAX.
VISCOUNT MILTON, M.P.
VISCOUNT GALWAY.
EDWARD AKROYD, ESQ., M.P.
JOHN WATERHOUSE, ESQ., F.R.S.
W. B. BEAUMONT, ESQ., M.P.
E. B. DENISON, ESQ.
LORD HOUGHTON.
JOHN SPENCER STANHOPE, ESQ.
JAMES GARTH MARSHALL, ESQ.
THOMAS WILSON, ESQ.

Council.

HENRY BRIGGS, ESQ.
DR. WM. ALEXANDER.
H. C. SORBY, ESQ., F.R.S.
HENRY HOLT, ESQ.
BENTLEY SHAW, ESQ.
RICHARD CARTER, ESQ.
T. W. EMBLETON, ESQ.
REV. DR. BURNETT.
DR. SCHOLEFIELD.
WM. CHADWICK.

Honorary Secretary.

WM. SYKES WARD, ESQ., F.C.S.

General Secretary.

HENRY DENNY, ESQ., A.L.S.

Honorary Curators.

J. G. MARSHALL, ESQ., F.G.S.
T. W. EMBLETON, ESQ.

Local Secretaries.

H. C. SORBY, ESQ., Sheffield.
HENRY BRIGGS, ESQ., Wakefield.
DR. ALEXANDER, Halifax.
DR. SCHOLEFIELD, Doncaster.
BENTLEY SHAW, ESQ., Huddersfield.
RICHARD CARTER, ESQ., Barnsley.
REV. DR. BURNETT, Bradford.
DR. PALEY, Ripon.

The Chairman then called on the Rev. John Stanley Tute to read the first Paper.

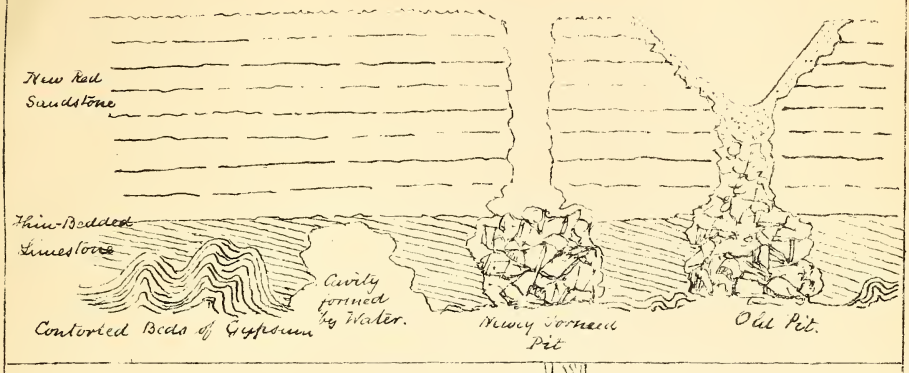
ON CERTAIN NATURAL PITS IN THE NEIGHBOURHOOD OF RIPON.

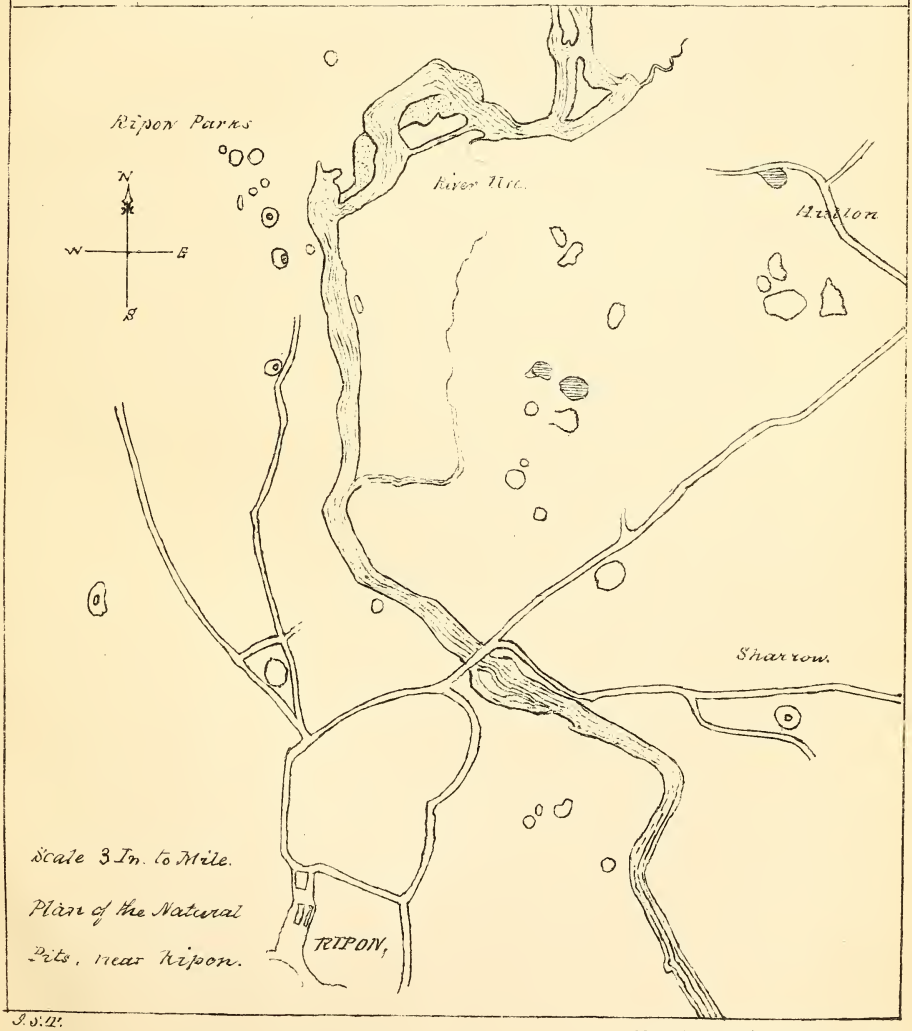
BY REV. JOHN STANLEY TUTE, OF MARKINGTON.

ON the north-east side of the city of Ripon, and within a rectangular area of rather more than a square mile,* there

* They are not, however, confined to this area, though the greater number occur within it.

Diagram shewing the supposed Formation of the Pits.





Scale 3 In. to Mile.

Plan of the Natural Pits, near Ripon.

J. S. U.

COWELL'S ANASTATIC PRESS, IPSWICH

occur many singular pits and depressions in the earth, which have given rise to various speculations as to their origin, and which, I think, are well worthy of the attention of geologists. In form, they are generally crater-like hollows, from fifty to a hundred feet across; and sometimes, though very rarely, large and deep perpendicular shafts. There are about thirty or forty of these regularly-formed depressions. But a large portion of the district has been thrown into a succession of little hills and valleys, in consequence of other irregular subsidences. In some cases these depressions contain water, though the greater number are dry. They seem all originally to have been formed as shafts; their present crater-like form being clearly due to the subsequent falling in of the sides. They generally, if not universally, occur within half-a-mile of the river Ure, which at this point flows round an escarpment of the new red sandstone. And another pit of the same character, about three miles from Ripon, in the village of Bishop Monckton, is also within a short distance of the river. One would naturally suspect, then, that the river had had something to do with their formation. This suspicion becomes strengthened when we come to examine the depth of the pits. In a shaft on the eastern side of the railway there is water at the bottom at the depth of 64 ft. 6 in., the width of the shaft being 41 ft. During dry seasons the water disappears, and at the bottom are seen the fallen rocks of the new red sandstone, through which the shaft is formed. As there must have been once a considerable hollow, now filled up with the sandstone rock, the true,—*i. e.*, original,—bottom of the pit must have been very much lower down—certainly more than seventy or eighty feet below the surface. Now the level of the river is about eighty feet below the top of the pit. So that here, in a pit which is one of the most distant from the river, we seem to be able to trace a connection between the two.

Some of these pits are of ancient date, but others have been formed recently. The one which I have just mentioned fell in during the month of June, 1836; and another on the opposite side of the river, even more recently—in the spring of 1860. The subsidence was noticed by the Rev. F. H. Dunwell, who has kindly furnished me with the following particulars. He was near the river-side with some of his pupils, watching some men who were fishing, when he heard a loud noise like thunder, and on looking round, he saw at a little distance a mass of earth and stones rising into the air, and falling back again. One of the men who were fishing went near, and found that a pit had been formed, in which was a quantity of water in a state of ebullition. It continued in the same disturbed state during the following day. Then the sides began to give way and to fall in rapidly, and the water subsequently disappeared. At present, one side of the shaft is perpendicular, the other side is broken in and slopes to the bottom. The depth of the pit on the day after it was formed was sixty-nine feet; the width, twenty-two feet; and the depth of water, twenty-seven feet.* It is cut through the uppermost strata of the magnesian limestone, here thin-bedded and in small slabs; but lying undisturbed with a gentle dip eastwards of five or six degrees. At a very short distance, and on the same side of the river, there are some beds of gypsum, which seem to pass beneath the magnesian limestone, and probably correspond with those beds of "lower red marl and gypsum" which Professor Sedgwick has traced "from the confines of Nottinghamshire to the south bank of the Wharfe, near Tadcaster." † He says, "The deposits of gypsum near Ripon may belong to the lower red marl and gypsum, or they may be subordinate to the lower part of the

* For these measurements I am indebted to Mr. Heslington, of Ripon.

† *Geol. Trans.*, 2nd series, vol. iii., p. 101.

upper red sandstone." * I think that most probably the former supposition is the true one, and that these pits are caused by the washing away of the red marl and gypsum by subterranean streams connected with the river. For the gypsum beds occur both here and at Bishop Monckton, where another pit has been formed. In the section exposed on the right bank of the Ure, the gypsum beds are very much contorted, and if this be a general condition of these beds in this district,† it is easy to see how readily their substance would be removed by the continual waste of running water, so as to leave at every place where these subterranean streams occur, dome-shaped caverns in the magnesian limestone, the uppermost beds of which, I think, overlie these gypsum beds.

It is worthy of notice that these pits seldom occur singly; but generally they are found in groups of two, three, or four. This grouping seems to be due to two or more neighbouring folds of the strata which one after the other have been hollowed out; for when the subterranean stream has spent its strength upon one contortion, and brought down into the hollow which it has made the overlying rock, it will naturally attack with greater effect the neighbouring contortion, rather than the harder rock of the new red sandstone, which has taken the place of the first.

Besides the two pits which I have mentioned, several others have been formed in the memory of persons now living. At Sharrow, one fell in during the night, about twenty years ago, and alarmed the inhabitants of a neighbouring house, who found in the morning little more than the breadth of the road between themselves and the pit. About forty years ago, some men at Bishop Monckton were making

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* *Geol. Trans.*, 2nd series, vol. iii., p. 110.

† The upper beds of this series near Ferrybridge are *contorted*. See *Geol. Trans.*, p. 101.

a stack near the old Hall, and had left it for a while; on their return they found that the ground had given way beneath the stack, which had disappeared. The men hastened in great consternation to their master, exclaiming, "It's gone! It's gone!" The hole still remains a receptacle for rubbish.

The following copy of a well-sinker's report will, I think, show how a pit may be formed in the new red sandstone, when a sufficient hollow has been formed below, and the limestone roof of the hollow gives way, for it shews that the new red is not a very coherent mass of rock:—

"The well is sunk on the top of Hutton Bank, and is 28½ yards deep. After cutting through the soil, which is not very thick, a soft, sandy, red rock, ten feet thick, was penetrated, and then a layer of soft marly clay, about ten inches thick. These clay layers occurred about every ten feet of rock. The rock was much harder as the shaft descended, and alternated red and white. The rock is not laid in horizontal layers, but is what well-sinkers call 'eddy-rock;' and not all inclining one way, but crossing one another with great irregularity, and at various angles of descent."*

I think, then, that these curious pits are due to the wasting away of the red marl and gypsum beds, rather than of the more solid beds of magnesian limestone which lie below, and that their occurrence in the neighbourhood of these gypsum beds is a strong presumption that such is the case. There are many caves indeed in the magnesian limestone, but they are not, as far as one can tell, large dome-shaped hollows, but long tortuous cracks and windings, often reaching to the surface, and forming along the streams which run over the limestone frequent swallow-holes, of no great size in themselves, but still in summer-time capable of taking in the whole of the streams, if they were not carefully stopped up.

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* I am indebted to the kindness of Mr. H. Thirlway, bookseller, Ripon, for this "Copy of a Well-sinker's Report."

There was a remarkable fact observed by Mr. Dunwell which deserves notice, viz., that the rock was seen to rise into the air at the time of the formation of the pit. This has been supposed to shew that these pits are due to some chemical process going on in the earth, by which a large quantity of gas is suddenly set free, and in this manner the hole is *blown out*. Such an explanation, however, scarcely agrees with the fact that all the materials of the pit fall to the bottom, and not any are thrown out. What Mr. Dunwell saw may be accounted for by supposing that the first fall of the rock, which produced the sound like thunder, caught and compressed a certain amount of air, which immediately afterwards, finding vent, threw upwards a quantity of earth and stones.

A Paper was then read by Mr. Lawson Tait, of Wakefield, entitled "Recent Speculations on Primæval Man," which, as it was of a partly controversial character, has not been forwarded for publication.

REMARKS ON THE EXTINCT FAUNA OF THE EAST RIDING OF YORKSHIRE. BY MR. EDWARD TINDALL, OF BRIDLINGTON. [READ BY MR. DENNY.]

In that part of the western boundary of the German Ocean between Flamborough Head and Spurn Point, is situated a tract of low land called Holderness, which, in early times, exhibited the alternate appearance of morass and lake, as the river Hull overflowed or subsided in its progress to the Humber. Trees and shrubs sprung up in the uncultivated land, and, spreading by degrees, formed large forests, which, confining the exhalations of the soil and obstructing the course of streams, caused the rivers to overflow, and stagnate into lakes and marshes. A great

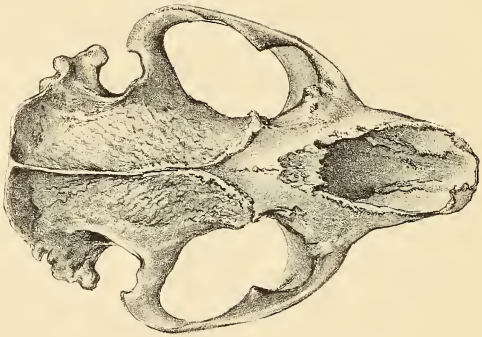
many of the marshes and the woods of Deira remained at the time of the Domesday survey, for its waters were "so abundant as to afford a fishery of 70,000 eels, and wood pastures eleven miles long and three miles broad."

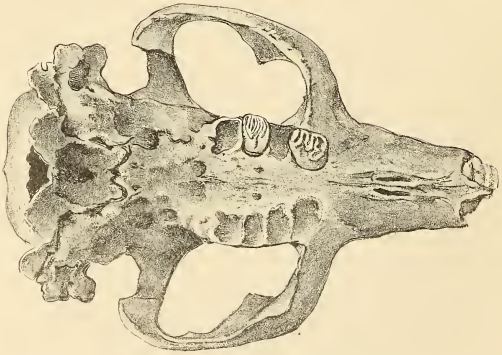
Most of the towns within the area here spoken of are, like the land, wet and damp. Woodmansea, near Beverley, and Rotsea, near Watton, bespeak the existence of meres in those places. Indeed, Watton—Saxon *Wetadun*—signifies a *wet town*, describing its situation as surrounded with waters and marshes. Skip*sea*, Withern*sea*, and Kiln*sea* indicate that a mere has existed in each of these places, as there is yet at Horn*sea*. The termination *sea* (or *sey*, as it is occasionally spelt) is not the modern word denoting the *ocean*, but is nearly synonymous with mere.

From the above remarks, it will be evident that the physical geography of the district, diversified as it appears to to have been by forests, lakes, and morasses, was eminently favourable to the habits of such mammals as those whose remains are now found buried in its bogs. The beaver had its natural haunts in the lake solitudes of Holderness; while the elk, gigantic deer, and reindeer would have the shelter of the primæval forests which then abounded in East Yorkshire; and from these sources an abundance of food for each tribe was always available.

The neighbourhood and coast of Holderness possesses much local interest, from the various relics of a geological or archæological nature which occur there, such as stone axes, stone hammer-heads, and rude canoes formed from the hollow stems of trees by the primæval inhabitants of the district; as also the remains of several extinct animals, which have enriched the museums of the late Mr. Strickland and myself, the latter of which contains bones of the *elephant, bear, elk,* and *deer*.

Amongst the most interesting remains of animals which





have been discovered in Holderness, may be enumerated those of the *Beaver*, *Elk* or *Moose deer*, and *Reindeer*—three species of mammals new to the Extinct Fauna of Yorkshire. Of the former animal, a very fine skull was exhumed during some extensive draining operations on the banks of a river near Wawne, in the neighbourhood of Beverley, in 1861, by Dr. Brereton, and who has kindly allowed the specimen to be exhibited at this meeting. The skull, it will be observed, has every indication of having belonged to a mature individual; measuring six inches in length, and four inches in width across the posterior part of the zygoma. The nasal bones, one incisor, and six of the molar teeth are wanting; in every other respect the skull is in a fine state of preservation, and deeply coloured by the peat.* Previous remains of this singular rodent have been found in lacustrine formations in *Scotland*, *Wales*, *Northumberland*, *Berkshire*, *Cambridgeshire*, and *Norfolk;* and it is very evident the beaver existed in Britain down to historic times, as the names of many places are derived from some peculiarity of the site in connection with that animal, as Befer-burne or Bever-brook, Befer-ige and Beferic, Bever-island, and Befer-lac or Bever-lake or fence; so evidently referring to the ordinary habits of the beaver as to prove its existence in the localities so named at that period. Leland, writing in the early part of the 16th century, mentions the town of Beverley, in Yorkshire, as not only having for its arms the animal "quod vocatur bever," but afterwards, on the authority of a writer of the life of St. John of Beverley, gives the name of the town as derived from that animal, which abounded there:—"Dierewald locus nemorosus, id est sylva Deirorum, postea Berlac, quasi locus, vel lacus castorum, dictus a castoribus, quibus

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* For the different views of the skull in the accompanying plate I am indebted to Mr. Hanson, photographic artist, of Leeds.

Hulla aque vicina abundabat" (tom. iv., pp. 34-100).* The correctness of this tradition, however, like many others, although very probable, has been questioned. Professor Phillips says Beverley, instead of being Bever-lac, owing its name to beavers and lakes, is simply Pedwar-llech, the Greek Petouaria, chief city of the Parisoi, from whence we have Bevorlac and Beverley.† Our specimen, therefore, possesses peculiar interest, both *geological* and *historical*, as being not only the first instance of the remains of the beaver which has been found in Yorkshire, but also as corroborating the former tradition of its actual existence in the neighbourhood of Beverley at remote periods, and therefore giving some plausibility to the name of the town.

When, however, it became extinct in Britain it is not so easy to determine; but that it was beginning to be scarce in the 9th century is evident, as Pennant cites a passage from an early record—the Leges Wallicæ, or the Laws of Howel the Good—to show the value of a beaver's skin was 120*d.*, while that of an otter was only 12*d.*; and again, we find that in the reign of Henry I., in the 11th century, an export duty of 4*d.* per skin was authorised to be levied at *Newcastle-upon-Tyne*—a large amount in those days.

The second animal whose remains I have to record as a former inhabitant of Yorkshire, is the Elk or Moose deer *(Alces malchis)*, which has occurred in two instances. In the spring of 1822, as some workmen in the employ of Messrs. G. and W. Tindall, nursery and landscape gardeners, of Beverley, were employed in digging out some drift gravel to construct a lake at Thorpe Hall, near Bridlington, the seat of Lord Macdonald, they found, at the depth of about four and a half feet from the surface, some of the bones and the

* Bede called the place where Beverley now is, Sylva Deirorum; Anglicè, Deirewald, p. 42.

† *Rivers, Mountains, and Sea Coast of Yorkshire*, pp. 105-201.

horns of the Elk (the largest of the Cervine family which still exists on the surface of the globe), and also a fine horn of the stag or red deer; and in the month of February, 1868, a horn and the occipital portion of the skull of a female specimen of the Elk were found during the process of draining, in a peat bog, about two feet below the surface, on the property of Sir George Cholmley at Carnaby, near Bridlington; and it is very probable the remaining parts of the skeleton of one of these animals may still be entombed in the same locality. Although the bones of this noble animal are said to have been found in different parts of the kingdom, the first authentic instance is in the *Transactions of the Tyneside Natural History Club* for 1861 (vol. v., pt. xi., p. 111), which contains a paper on the discovery of a fine shed horn of the Moose deer or true Elk at Chirdon Burn, North Tyne, near the bottom of a peat formation, resting partially on the coarse gritty marl formed by the weathering of the subjacent strata. Mons. Lartet detected a lower jaw of the Elk amongst other mammalian remains found in the cave of Llandebie, in South Wales, in 1861. There is a statement that in 1710 the horns of a Moose deer were dug up out of an old pond at Mainfort, near Sedgefield; and also that in 1827 a very fine specimen of an elk's horn was dug up in the vicinity of West Water, near Chatteris, in Cambridgeshire. From the date, however, given (1822), it will be evident the Yorkshire specimen is the first reliable example on record of the *moose* occurring in Britain, as Professor Owen does not include it in his *History of British Fossil Mammals*, published in 1846, or in his *List of Fossil Mammals* in the *Reports of the British Association;* which he most undoubtedly would have done had these instances been authenticated. I therefore suspect that in both the cases alluded to the horns have been of the large red deer or of the Megaceros, and not those of the true Elk,

as the term elk was formerly indefinitely used for any large deer's horns, without their precise identity having been determined—a point very easy to decide by a competent authority.

Although we have no historical records of the former existence of the Elk in Britain, it is enumerated by Cæsar as living in the great Hercynian forest during the Roman period; since which, by the destruction of the ancient forests and other effects of civilization, the Elk, like many of its contemporaries, has entirely disappeared from its early haunts, except Northern Europe, Northern Asia, and the wooded districts of Canada and the United States. It appears to have been well known to the lake dwellers in Switzerland, amongst whose rejectamenta its remains occur, and from which district it has, however, also long since disappeared.*

The third addition to the Extinct Fauna of the East Riding of Yorkshire is of another interesting species of the same family—the Reindeer. In 1860 I found, at the base of the cliff, in a lacustrine deposit near the top of the lake at Skipsea, the horn of the Reindeer, and also of the large variety of the Red deer, both of which are now in my possession.

It is somewhat remarkable that the three animals to which I have called attention, as formerly inhabitants of East Yorkshire, are all of strictly *boreal* habits, and afford evidence, as Mr. Boyd Dawkins observes, "that the climate of Pleistocene Britain was more severe than it is now; that at a time when Britain formed a portion of the Europæo-Asiatic continent, it more closely resembled that now obtaining in the fur-countries of Northern Asia than elsewhere." As connected with this portion of my subject, I cannot

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* *The Lake Dwellings of Switzerland and other parts of Europe*, by Dr. F. Keller; translated by J. E. Lee. 1866.

conclude better than by quoting the following apposite remarks by a writer in *Land and Water*, signed "Alces":—

"The study of northern zoology presents a variety of considerations interesting both to the student of recent nature and to the palæontologist. Taking as well-known instances the reindeer and musk ox, there are forms yet inhabiting the Arctic and sub-Arctic regions, which may be justly regarded as the remains of an ancient Fauna which once comprised many species now long since extinct, and which, with those already named, occupied a far greater southerly extent of each of the continents converging on the pole than would be possible under the present climatal conditions of the world. With those great types which have entirely disappeared before man had recorded their existence in the pages of history, including the mammoth *(Elephas primigenius)*, the most abundant of the fossil pachyderms, whose bones so crowd the beaches and islands of the Polar Sea that in parts the soil seems altogether composed of them, the *Rhinoceros tichorinus*, and others, were associated genera a few species of which lived on into the historic period, and have since become extinct; whilst others, occupying restricted territory, are apparently on the verge of disappearance. 'All the species of European pliocene bovidæ came down to the historical period,' states Professor Owen, in his *British Fossil Mammals*, 'and the aurochs and musk ox still exist; but the one owes its preservation to special imperial protection, and the other has been driven, like the reindeer, to higher northern latitudes.' Well authenticated as is the occurrence of the rangifer as a fossil deer of the upper tertiaries, the evidence of its association, in ages so remote, with *Cervus alces*, has been somewhat a matter of doubt. The elk and the reindeer have always been associated in descriptions of zoology of high latitudes by modern naturalists, as they were when the boreal climate, coniferous forests, and mossy bogs of Ancient Gaul brought them under notice of the classic pens of Cæsar, Pausanias, and Pliny. And there is something in common to both of these singular deer which would seem to connect them equally with the period when they and the gigantic contemporary genera, now extinct, roamed over so large a portion of the earth's surface in the north temperate zone, where the fir-tree—itself geologically typical of a great antiquity—constituted a predominant vegetation.

"The presence of the remains of *Cervus alces* in association with those of the mammoth, the great fossil musk ox *(Ovibos)*, the fossil reindeer, and two forms of bison, in the fossiliferous ice-cliffs of Eschscholtz

Bay, as described by Sir John Richardson, would seem to be an almost decisive proof of its existence at a time when the temperature of the shores of the Polar Sea was sufficiently genial to allow of a vegetation affording forage and cover to the great herds of mammals which have left their bones there with buried fossilized trees, attesting the presence of a forest at a latitude now unapproached save by shrubs such as the dwarf birch, and by that only at a considerable distance to the south.

The elk of the present day, so far as we understand his habits, unlike the musk ox or reindeer, for which lichens and scanty grasses in the valleys of the barren grounds under the Polar Circle afford a sufficient sustenance, is almost exclusively a wood eater, and could not have lived in the locality above indicated under the present physical aspects of the coasts of *Arctic America*, any more than the herds of buffaloes, horses, oxen, and sheep, whose remains are mentioned by Admiral Von Wrangel as having been found in the greatest profusion in the interior of the islands of New Siberia, associated with mammoth bones, could now exist in that icy wilderness. On these grounds, therefore, a high antiquity is claimed for the sub-genus *Alces*, probably as great as that of the reindeer.

"Passing on to pre-historic times, when the remains of the species found in connection with human implements prove its subserviency as an article of food to the hunters of old, we find the bones of *Cervus alces* in most of the Swiss and other Lake Dwellings, and in refuse-heaps of that age; whilst in a recent work on travel in Palestine, by the Rev. H. B. Tristram, we have evidence of the great and ancient Fauna which then overspread temperate Europe and Asia having had a yet more southerly extension; for he discovered a limestone cavern in the Lebanon, near Beyrout, containing a breccious deposit teeming with the *débris* of the feasts of pre-historic man—flint chippings evidently used as knives, mixed with bones in fragments, and teeth, assignable to a reindeer, a bison, and an elk. 'If,' says the author, 'as Mr. Boyd Dawkins considers, these teeth are referable to the now exclusively northern quadrupeds, we have evidence of the reindeer and elk having been the food of man in the Lebanon not long before the historic period; for there is no necessity to put back to any date of immeasurable antiquity the deposition of these remains in a limestone cavern. And,' he adds, with significant reference to the great extension of the ancient zoological province of which we are speaking, 'there is nothing more extraordinary in this occurrence than in the discovery of the bones of the tailless hare of Siberia in the breccias of Sardinia and Corsica.'"—Vol. v., No. 119, p. 233.

ON A NEW CARBONIFEROUS LABYRINTHODONT FROM THE NEIGHBOURHOOD OF BRADFORD. BY MR. LOUIS C. MIALL, CURATOR OF THE BRADFORD PHILOSOPHICAL SOCIETY.

Remains of amphibia are by no means rare in the coal-shales of the British Isles, and so many specimens of vertebræ, scales and teeth, belonging to this class, are found under various names in most of our museums, that it is a little strange that the genera archegosaurus, anthracosaurus, pholidogaster, and the rest, are so unfamiliar, and that writers on general geology go on repeating that no vertebrata higher than fishes are found in the coal-measures of Britain. The museum of the Bradford Philosophical Society contains many fragments of batrachians, which have been assigned to various fishes, some of them by eminent authorities. About a year ago, I placed a number of these aside for special examination, finding such peculiarities among them as bicipital ribs, vertebræ with well ossified apophyses and labyrinthodont teeth. The literature of this subject is so scanty and so recondite that I was unable to identify these remains with any described carboniferous amphibia, nor did the national museums throw any clear light upon the subject. At this time a few fragments, comprising several vertebræ and ribs identical with some already in my possession, were brought to me by an intelligent miner from Dudley Hill, who held out a hope of recovering further remains of the same animal. The remains were discovered in the roof of the Black Bed Coal at Toftshaw, near Bradford. After much delay and a good deal of labour (for the specimen was discovered in the roof of a coal-seam which had yet to be worked), a fine fossil, nearly six feet in length and in fair preservation, was recovered. Twenty-six vertebræ, eighteen ribs, a well-marked skull showing forty-two teeth, and a very large number of scales, were

found in something like their proper relative position. This fine specimen has been sent for description to Professor Huxley, and a notice of it will appear in the next volume of the Geological Society's Journal. Judging from the similar remains in the British Museum and in the Museum of Practical Geology, the species is as yet unknown. It is nearly allied to *Pholidogaster*, but will probably be distinguished from the only species of that genus. While waiting for a full and authoritative account, I have thought that this interesting fossil from the Yorkshire coalfield merits a notice in the memoirs of this Society. I shall be glad if the few remarks I can at present offer may stimulate our local palæontologists to search more diligently than hitherto among the osseous remains which they have hitherto assigned to megalichthys, or other sauroid fishes. I am fully persuaded that the bones of labyrinthodonts are in this neighbourhood, at all events, more common than any others, and it may fairly be expected that many points at present obscure will be elucidated whenever the general atmosphere of puzzle which prevails respecting the identification of carboniferous amphibia shall be fairly dispelled.

The specimen which I have to describe is somewhat irregular in the disposition of the various parts. As in liassic saurians, and other vertebrate remains, a certain amount of displacement has occurred. The cranium, with its beautifully sculptured ganoid plates, is apparently nearly perfect. The upper jaw exhibits an external row of eighteen teeth, the internal row, which doubtless studded the palatine aspect of the vomer, being unseen. The lower jaw is divided into halves, which together contain twenty-four teeth. The coracoids, as in archegosaurus, are represented by two flat rhomboidal plates. This is the only relic of either thoracic or pelvic limbs, but it is conclusive as to their existence. The under surface of the body has been evidently defended by

broad bony plates, three in number, of which the two outer partly conceal the medium one, their internal edges diverging backwards. The vertebræ visible are twenty-six in number, and average about an inch in diameter of centrum. They are biconcave, and the short sides are slightly concave, with a very distinct rugose marking. The neural arch seems to have been very small in proportion to the size of the centrum, as is always the case with cold-blooded animals. In some of the detached vertebræ the processes are entire, but in most they are detached from the centrum, having been imperfectly ossified. I infer from this and other indications that the animal whose remains are now, after so long an interval, disinterred, was not adult. The spinous process, the zygapophyses, and the pleurapophyses are well seen. Eighteen ribs have been found. These all present the interesting character of a double articulation. The tubercle and capitellum are in many cases perfectly distinct. Both facets probably articulated with the pleurapophyses of the vertebræ. The specimen further exhibits about seventy-four well-marked scales. These are about an inch and three-quarters in length, and are crossed diagonally along the greater part of their length by a rounded ridge. The rest of the scale is flattened. At one end the scale is prominent; the other end in all cases thins away gradually. The scales were doubtless imbricated and arranged along the ventral surface as in *Pholidogaster*. These scales are osseous, and comparable to the scales of ganoid fishes. The teeth are about three-quarters of an inch in length, striated near the base, inserted into and partially anchylosed to shallow sockets. A section shows the rudimentary form of a labyrinthodont tooth, radiating, but not as yet sinuous, folds of cement penetrating the outer half of the substance of the tooth. Further details must be reserved for the completer examination to which our specimen will, I hope, soon be

subjected. It will be seen that the most important facts are readily accessible. We have to regret the loss of the orbits, the limbs, and the tail.

Any discussion of the probable affinities of this specimen with other recent or fossil forms of life is so closely connected with those details which have been brought to light by previous discoveries of a similar kind, that it will be as well to recapitulate briefly what is already known of carboniferous amphibia. The first remains of this kind were found in the clay slate of the upper Bavarian coal-measures, in the Saarsbruck coalfield, and in the Brandschiefer of Münster-appel, in Rhenish Bavaria.* The genus *Archegosaurus* was established by Goldfuss upon characters derived from these specimens. The chief points in which that genus differs from our specimen are these:—Archegosaurus has a notochordal or imperfectly ossified vertebral column, and the occipital condyles are also cartilaginous. There is much resemblance between the two in other points—such as the general characters of the skull, the three pectoral plates, the natatory limbs, and the labyrinthoid teeth. Goldfuss was inclined to refer Archegosaurus to the reptiles proper. This view was opposed by Professor Owen, who pointed out its affinities with the perennibranchiate batrachia, and placed it in his order *Ganocephala*. The interesting discussion in Owen's Palæontology should be consulted by those who wish to know the grounds of this decision. More recently a numerous series of amphibia has been disinterred from the Airdrie black-band ironstone, from the Gilmerton limestone, and from the Kilkenny coalfield. These have been all figured and described by Professor Huxley, whose memoirs in the *Geological Journal* (1862, 1863) and in the *Transactions of the Royal Irish Academy* (vol. xxiv.) now constitute

* Goldfuss, Neues Jahrbuch fur Mineralogie, 1847. Hermann von Meyer, Palæontographica, 1849. Bd. 1. Burmeister, Zeitschrift für Zoologie, 1848. Bd. 1.

an indispensable part of the literature of this subject. A fine skull, 15 in. by 12 in., exhibiting the under or palatine aspect, with numerous broken teeth in two rows (many of the teeth presenting radiating involutions of the pulp cavity) furnished the new genus *Anthracosaurus*. To this genus were also referred a vertebra and rib found in the same bed in the Airdrie coalfield, which had previously furnished the skull. These last remains are identical with those attached to the Low Moor fossil, and from our recent discovery we shall be in a position to decide that they are quite distinct from the type skull of anthracosaurus (now preserved in the Museum of Practical Geology). A number of interesting specimens, comprising a land mollusk *(Pupa vetusta)*, a chilognathous myriapod *(Xylobius)*, and various reptilian remains, have been found at different times by Dr. Dawson within hollow trunks of sigillaria, in the coal-measures of Nova Scotia. These have been described by Professor Owen *(Geol. Journal*, 1860). Although the American specimens unquestionably are nearly related to some of those already mentioned, the disastrous and discreditable strife carried on by our two greatest comparative anatomists renders them unwilling to cite each other's labours, and a satisfactory *resumé* of the whole question seems at present impossible. A new amphibian (pholidogaster) in fair preservation, and throwing much light upon our subject, may be seen in the British Museum. A description and figure by Professor Huxley will be found in the *Geological Journal* (1862). Pholidogaster exhibits well ossified vertebræ and an arrangement of ventral scales very like archegosaurus. Messrs. Hancock and Atthey have also found in the Newcastle coalfield numerous remains of labyrinthodonts, one of which, named by them *Pteroplax cornuta*, is nearly allied to the present form. Dr. Young and Mr. Thomson have added various new species from the neighbourhood of Glasgow, fuller details of which are promised.

It is as yet very difficult to compare the scattered and imperfectly known remains which are daily discovered. Lastly, five new genera of amphibia have been discovered in the Kilkenny coalfield. These are described and figured in vol. xxiv. of the Royal Irish Academy, by Professor Huxley. An abstract of this paper is to be found in the *Geological Magazine* for April, 1866. In all, three genera of vertebrata higher than fishes have been found in the carboniferous strata of Germany, viz., archegosaurus, sclerocephalus, and apateon; six are described from Great Britain, viz., parabatrachus, anthracosaurus, loxomma, pholidogaster, pteroplax, and anthrakerpeton; five from the Kilkenny coalfields, viz., urocordylus, ophiderpeton, ichthyerpeton, keraterpeton, and lepterpeton; and five from Nova Scotia, viz., baphetes, raniceps, dendrerpeton, hylerpreton, and hylonomus. How many of this formidable list will stand the tests of time and further investigation is most uncertain.

Nearly all the peculiarities which I have enumerated serve to approximate our specimen to archegosaurus and the triassic labyrinthodontia. The position of the whole group is somewhat disputed. You are familiar with the toad-like restoration of labyrinthodon which Professor Owen has put forth. You are, perhaps, also aware that Professor Huxley (on this point as on most others) entertains a different opinion, assigning to labyrinthodontia a distinct order of amphibia, co-ordinate with batrachia, sauro-batrachia and ophiomorpha, and ranking the labyrinthodonts as urodele rather than anourous. If we accept this provisional arrangement, we have a group (labyrinthodontia) characterised by the hard, polished and sculptured cranial plates, two sets of teeth (vomerine and palatine) in the roof of the mouth, three pectoral plates, bi-concave vertebral centra, weak, natatory limbs and labyrinthoid teeth. This order is further divided by Professor Huxley into two sub-orders: *mastodonsauria*,

including anthracosaurus and the triassic labyrinthodonts, and specially distinguished by their well ossified vertebral column, and the presence of two occipital condyles; and *archegosauria* (archegosaurus, pholidogaster, &c.) in which the vertebral column is notochordal, and the occipital condyles either cartilaginous or wanting altogether. This classification will be understood at a glance by the aid of the appended table:

AMPHIBIA (Batrachia of Cuvier).

Batrachia.
Saurobatrachia.
Ophiomorpha.
Labyrinthodontia.
Archegosauria (Ganocephala, Ow.)
Mastodonsauria (Labyrinthodontia, Ow.)

This imperfect account must suffice for the present. I hope, with Professor Huxley's assistance, to bring fresh details to light. All such fuller information, with any necessary corrections of the present hasty sketch, will be found in the forthcoming volume of the Geological Society. Let me urge any members of this society who have in their possession vertebrate remains from the Yorkshire coalfield to study them afresh, and search particularly for those batrachian characters which are so easy to detect in almost any fragment. The relations of the carboniferous and triassic labyrinthodontia have been discussed with reference to the doctrine of progressive modification, and as the specimen just described throws additional light upon this important inquiry, a few words on the subject will, I trust, be pardoned. Lamarck's views on the transmutation of species, though so crude and unsupported by adequate evidence, have long exercised an important influence on geological speculation. It has been asserted over and over again that the fossil remains of successive strata exhibit an uniform advance in degree of organi-

sation; and this teaching has been widely spread by the writings of Cuvier, Owen, Hugh Miller, and Murchison. It has been common to point to the notochordal vertebral column of palæozoic fishes, to the ichthyic characters of the liassic reptiles, to the numerous identical body-segments of the trilobites, and ask whether all this does not imply an embryonic and undifferentiated grade of life as characteristic of early geological periods. But these views will be put to a fair test if we compare nearly allied animals and plants of different ages, noting their resemblances and differences, and estimating their modifications with reference to progressive development. Do we find the Silurian *calymene* to be more embryonic than its Devonian congener? Are any more recent trilobites so highly differentiated as *agnostus?* Are the carboniferous representatives of the order in any respect more perfect than those of Cambrian age? Or take the brachiopoda—what mesozoic or tertiary form is so complex as the palæozoic *spirifera?* In what particulars does the *waldheimia* of our Australian seas exhibit a higher organisation than the *waldheimia* of the oolite? Among fishes—to what more differentiated forms have the palæozoic ganoids given origin? What evidence do forms of long duration, such as *lepidotus* and *beryx*, give of progressive improvement? Examined in this manner the generalisation would soon take a different shape. Professor Huxley has briefly reviewed the evidence in his anniversary address to the Geological Society (1862). Among invertebrata he finds no support for the doctrine. Of the vertebrata two groups seem to furnish satisfactory examples of progressive modification of the vertebral column, in correspondence with geological age, viz., the pycnodonts among fishes and the labyrinthodonts among amphibia. Professor Huxley rests the latter part of his decision upon the fact that, while the carboniferous archegosaurus had very imperfectly developed vertebral centra,

the triassic mastodonsaurus had the same parts completely ossified. The only other cases cited in the same address as affording apparent confirmation to the doctrine of progressive development are the dentition of anoplotherium as contrasted with that of recent artiodactyles, and the advance in degree of ossification of some cartilaginous fishes and some crocodilia and lacertilia. It is worth notice that the case of the labyrinthodonts upon which the chief stress is laid, has since the delivery of this address broken down altogether. We can now show from the specimen just described that the vertebral column of the carboniferous labyrinthodont is as well ossified as that of any of its triassic allies. Pholidogaster also exhibits osseous vertebral centra, so that we can fairly say (if Mr. Huxley's summary of the evidence be reliable) that of three-fourths of the examples cited, one-half are already shown to be fallacious. It would be wandering too far to pursue this subject any more. The present condition of geological discovery, while not disproving the theory of descent with modification, which is on other grounds so probable, seems to discourage all attempts to refer the present life of the earth to a single germ developed in the remote past. If we must use metaphors, perhaps the most appropriate would be—divergence in all directions from an undifferentiated axis, the length of the axis indicating the geological relation. Should this view be advanced with those proofs which the present position of palæontology affords, I hope it may be discussed with that impartial and searching scepticism which is so necessary for the attainment of scientific truth.

Note.—*Sept.*, 1869. A description of this fossil, accompanied by drawings of some of the details, will be found in No. 99 of the *Geological Journal*. Professor Huxley thinks it best to recognise the fossil as a new generic and specific form, for which he proposes the name of *Pholiderpeton scutigerum*.

ON THE OCCURRENCE OF FLINT IMPLEMENTS AT ADEL, NEAR LEEDS, WITH SUGGESTIONS AS TO THE PROBABLE PERIOD OF THEIR DEPOSIT. BY HENRY DENNY, A.L.S.

The occurrence of flint implements at the present day in such a variety of localities has caused considerable doubt in the minds of some persons as to the authenticity of the articles so found, which in certain instances may not be without grounds for suspicion, since the notorious fabrications of Flint Jack have been spread through the country. In all such cases, however, there are certain facts to be taken into consideration, and precautions necessary to be kept in view, before conclusions can be arrived at with any degree of probability. Such as the following:—

In the *first* instance, Are the *localities* where such objects have been found those that are known to have been occupied by the Britons, Saxons, or other colonists of this island; or have the articles been found in the tumuli or earthworks of these early races, and with whose remains they may have been interred? and, *secondly*, the material of which they are generally made, does it occur *geologically* in the neighbourhood? If not, then the flint must have been brought from a distance for the especial purpose of fabrication into rude implements by the people who used them; and are therefore not accidental either as to their *form* or *occurrence*, but truly the work of man's hands in *primæval times*, and as such, like the *coin* or *medal* to the numismatologist, serve to illustrate faithfully the gradual progress of art, however rude, at a period antecedent to the introduction of metals by conquerors or more civilized nations with whom the aborigines became subsequently amalgamated.

The proofs, however, that such objects are really the genuine productions of pre-historic men are not generally received by the world at large, and can only be arrived at

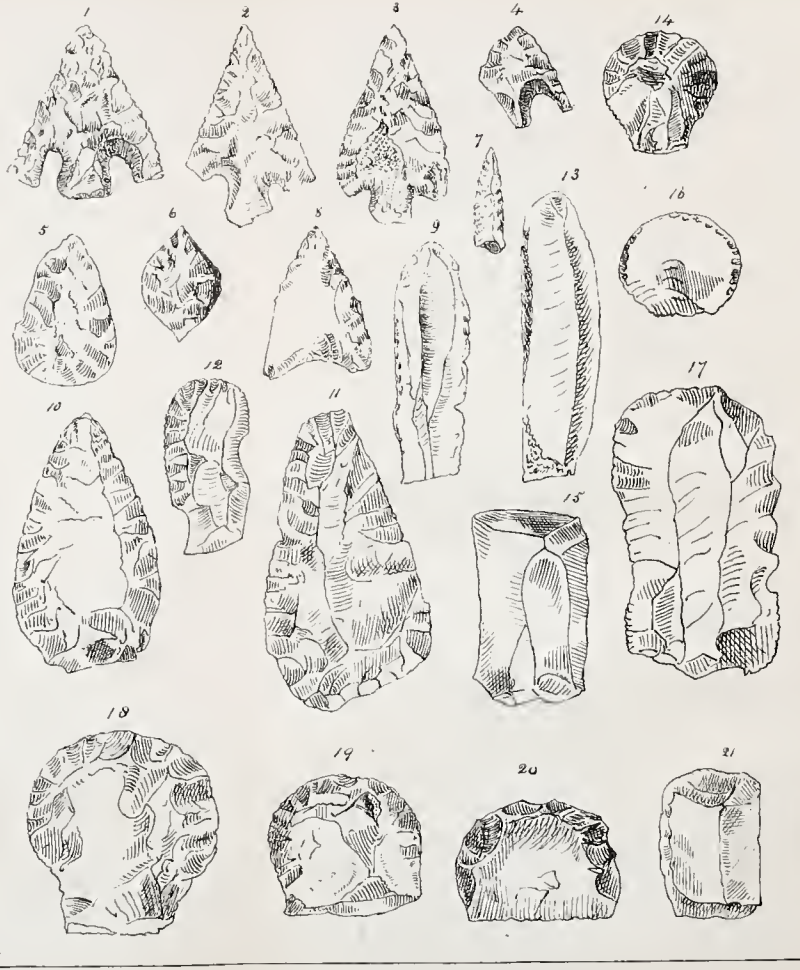
satisfactorily by a process of reasoning which is easy to carry out, and perfectly legitimate in its deductions. For instance, a *single* fractured flint, with perhaps little or no *definite* form, may present to the eye of those unaccustomed to examine such relics, no traces of an ethnological or historic character. But when we find *several* fragments of a similar appearance, and of a concavo-convex shape, flakes evidently struck off from the sides or angles of a mass of flint, the fact instantly and very naturally suggests itself that they are not the results of *accidental* fracture or the effects of frost, but rather that of a succession of blows, as a slight convex or conchoidal prominence, which denotes the point or bulb of concussion where the blow was applied, is almost invariably observable at the end of the flake; and when, in addition to this, we find also other fragments in further progress of formation into some form of implement; and others, again, *complete* and rather *artistic* in *finish*, as arrow-heads, with barbs and tangs, the sides minutely chipped, and the two surfaces ingeniously constructed one much more convex than the other: under such circumstances, we cannot arrive at any other reasonable conclusion but that we have before us the veritable manufactures of a primitive people; as it requires no arguments to prove that the crude flints, the flakes, and finished weapons are all historically connected with each other, and form individual links in the same chain of reasoning. Hence flint or stone implements and fragments which can be shewn to conform to the premises already laid down, both *geologically* and *structurally*, are undoubtedly genuine.

There is one very remarkable fact connected with stone and flint implements, that the *same form* appears to have originated in the minds of various races of people widely separated by *time* and *space*, as the primæval Celtic inhabitants of Britain, Sweden, Denmark, and France, the lake dwellers of

Switzerland, the early races of India, the Red Indians of America, the primitive Greenlanders, the modern Esquimaux, and the natives of the South Sea islands, with some of whom we cannot trace any probable intercommunication in ancient or modern times, and we can only conjecture that a similarity of wants have suggested a similarity of endeavours to provide for their attainment, whether in implements for domestic purposes, the chase, or war; which conclusion, however, is not quite satisfactory, and it remains still for the ethnologist and anthropologist to adduce some additional and more probable evidence which will explain this singular coincidence.

Now, although flint and stone arrow-heads, adzes, knives, scrapers, saws, sling-stones, &c., have long been found in considerable numbers in the neighbourhood of Bridlington, Malton, and along the Wolds, no instances have occurred in the West Riding or this district, that I am aware of, except at distant intervals an occasional adze or hammer-head has been picked up on the moors; some of which, I believe, are now in the Museums of the Halifax and Bradford Philosophical Societies, and in the possession of the Rev. W. C. Lukis, of Wath rectory, near Ripon.

In the ancient village of Adel, however, during the past autumn of 1868 and the spring of 1869, while excavating a small plot of ground about fifty yards square at the back of the Reformatory, numerous fragments of flint have been found, as also various implements of the same material, which consist of three beautifully-finished arrow-heads, with tangs of different shapes; a broken arrow-head of shorter proportions; several oblong, conical, or leaf-shaped arrow points, without tangs; javelin-heads; knives; numerous flint flakes; one very small three-sided implement or point, evidently intended to fix at the end of an arrow, carefully chipped up each side; another small, flat, lozenge-shaped implement, elaborately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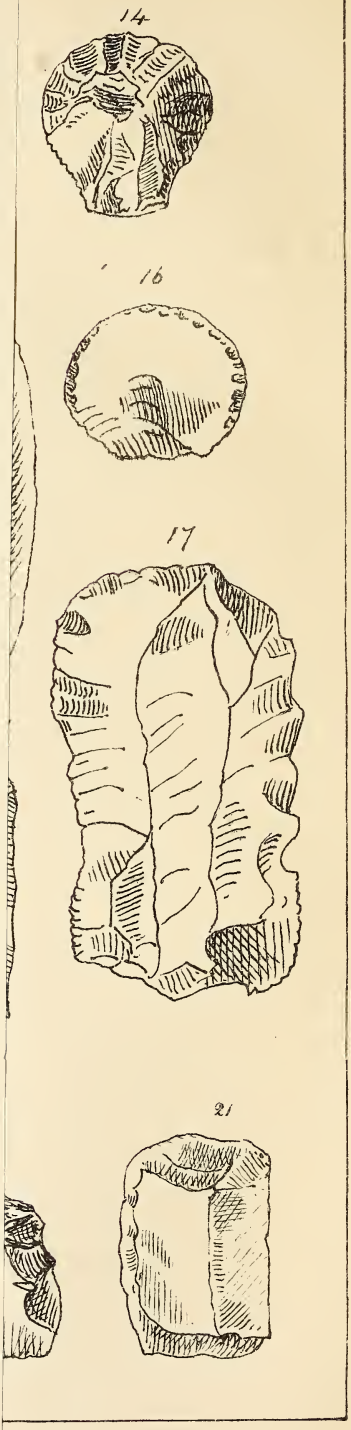
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chipped into form, as if intended for insertion also into the end of an arrow, and probably constructed to allow of its being reversed if one point was broken; a few slightly hemispherical masses of flint, rudely chipped into shape, and probably intended as sling stones; several semi-circular implements, also carefully chipped into form, which Mr. Evans considers as having been scrapers, from the circumstance that amongst the Esquimaux of the present day implements of precisely similar character are still used for scraping the skins of animals. Whatever other use these may have had, they appear to have been in general request, as we find them in different parts of Britain worked into one uniform pattern. There are also several flints of different sizes, of a rather singular shape, and so strongly resembling *gun* flints that I was at first doubtful as to their authenticity.* In an able and interesting lecture, however, delivered by my friend Mr. Evans at the opening of the Blackburn Museum, "On Man, and his earliest known Works," he states that Egyptian arrows have been found tipped with small arrow-heads of flint, in form much *resembling gun flints;* again, that in the account of the army of Xerxes, Herodotus mentions the Ethiopians as having long bows and short arrows, with sharp stones instead of iron for points; and also that flint arrow-heads have been found in Greece, on the field of Marathon (whose date would be B.C. 490), and may, therefore, have been of a similar form, which is well adapted for inserting between the split end of an arrow, and then held in position by a tight band.

The flints now under consideration have all been picked up by the boys at the Reformatory while employed in digging the ground, and who would have thrown them away but for the accidental circumstance that one of them having been seen by Mr. Twigg, the indefatigable super-

* See Plate.

intendent, who immediately recognized the great *similarity* it bore to some of the beautiful examples of flint implements in the Art Treasures Exhibition, then open in Leeds. He therefore stimulated the boys by a trifling reward to a more careful search, and the specimens since found he has presented to the Museum of the Leeds Philosophical and Literary Society, with the exception of one very beautiful arrow-head, of broader shape, which is now in the possession of Mrs. Eddison, of Adel.

In the year 1867, a flint flake, with bevelled edges, was also picked up in the same locality by the Rev. R. J. Mapleton, who instantly perceived the interest of so trifling an object in an archæological point of view, and gave me the specimen. From the limited space in which they have all occurred, it would appear to have been the site of a manufactory of these rude implements to meet some anticipated emergency, the material for which has evidently been brought from a distance, as we know that geologically flints cannot have occurred at Adel or anywhere in the neighbourhood of Leeds, situated as it is on the coal-formation, with its accompanying sandstones and grits. The nearest point, therefore, at which they could have been obtained is the chalk districts on the N.E. coast, as Scarborough, Bridlington, &c.*

It is very probable that many other specimens may have been turned up during the enclosure of the moorland at different periods, for as early as 1715, Thoresby figured in his *Musæum Thoresbyanum* two *flint arrow-heads*, which were found near *Adel mill*. One has a tang and barbs, the other acutely ovate, precisely like some found at Bridlington, by Mr. Tindall, and therefore probably the productions of a

* What adds to the probability of their manufacture on the spot is that not only considerable numbers of flint chippings occur, but also the *flint cores* from which they had been struck.

branch or colony of the same race, and who may have brought with them such materials as their experience taught them would be essential in the course of their inland migrations.

Now, the question arises, How can we account for the occurrence of flint implements at all, in this particular locality, as we have no record of a settlement of the early Britons at Adel? In the first place, it must be borne in mind that comparatively little of the history or movements of those primitive people has come down to us. In many instances all we know of their having had any particular settlement is derived from the accidental discovery of their coins or burial mounds, from which we naturally infer at least temporary occupation. It is, therefore, pardonable to endeavour to fill up such blanks as occur in the annals of this early people from the scanty memorials or traditions we have.

It is recorded that at Winmoor, in the parish of Seacroft, a great battle was fought between Penda, king of the Mercians, and Oswiu, king of Northumbria, in 655; and the Annals of Nennius contain a notice of the final engagement between these rival forces on the field of Gaii or Giti, in 656. The place where Penda's army was encamped is called *Manau* or *Manu*. The exact position of these places, however, is uncertain, as it is difficult to reconcile the early names with those at present known. The Rev. Daniel H. Haigh, in an interesting paper read before this Society in January, 1857, in alluding to the Annals of Nennius, ventures an ingenious suggestion as to the correct reading of these localities. That as *Gu* and *G* are constantly written for *W* in the early transcripts, and hence *Giti* will be *Witi*, to which if *wood* is added most probably means Witiwood, or *Weetwood;** and the same with *Manu* for Meanwood,

* In Thoresby's *Ducatis* we find that Dr. Hick gives *Woetur* as the Saxon for Weetwood.

where Penda was encamped. If such was the position of the Mercian forces, who probably moved by *Shadwell, Thorner,* and *Blackmoor* to Meanwood, it thus affords some clue to the occurrence of the flint implements at Adel, which may have belonged to the Britons under Oswiu, who, if they took up position on the low moorland at Adel to intercept Penda's army, would be only separated by a small stream (Adel-beck) from the enemy on the high ground at Meanwood; and, therefore, Adel may have been the stronghold of the British forces in defence of the royal city of *Oswiu* at Leeds, against which the Mercian attack was principally directed. Be this as it may, however, as we know the Brigantees had positions at *Rombald's moor, Baildon moor, Lightcliffe, Bramham moor, Osmondthorpe,* and also along the Wolds up to the East coast, it is not improbable that in passing through the country they may have occupied Adel, though there is no indication that any lengthened stand was made here, as the site does not appear of even sufficient importance to have handed down its name to the present day, unless the place, in the parish of Adel, called *Burhedurum* in *Domesday Survey,* indicates this spot.

I am aware that in the opinion of some archæologists the decisive battle of Winwædfield, as it is called, was fought at Whitwood or Winmoor, and the ford crossed by the retreating army of Penda was the Aire at Woodlesford.* But from

* As some confusion has arisen between St. Oswald, and Oswy, or Oswiu, and the statue of the former over the porch of Methley Church having been considered as evidence that the battle of Winwæd was fought in that neighbourhood (as St. Oswald is reported to have made a vow to build a church if he obtained a victory over Cadwalla), I wrote, therefore, to my friend, the Rev. D. H. Haigh, for his opinion on the question, and received the following reply:—"I once thought that Woodlesford might be the scene of the battle, but I was influenced by a wrong etymology. Woodlesford is certainly the 'ford of *Wothel* or *Wodel*,' a name of which we have other occurrences simply, as on a coin of one of the kings of Mercia, and in composition, as in the name of Wothelgeat, the ancestor of the

Winmoor and Seacroft, where, according to tradition, previous engagements of the Britons and Mercians had taken place, it is quite as likely for the forces to have moved by the barren moorland across the country to Meanwood and Weetwood, en route to the British villages at Ilkley and other districts to the north and north-east, or to attack Leeds from that direction. Presuming this to have been the course taken by the rival armies, and that having met at Meanwood great slaughter ensued, and the kings of the Mercians and East Angles, together with thirty of the principal commanders, are recorded to have been defeated and left dead on the field, upon which the routed Mercians fled, and, in seeking the nearest ford, which proved so disastrous to them, they would pass by Horsforth or Headingley to Kirkstall, and there attempt to cross the *Winet, Wynnet,* or *Vinwed,* the name by which the river Aire was anciently known.

Gale, in a letter to Thoresby, says: "Search if the name of that river Aire may not have been several times changed betwixt its head and mouth at Kirkstall. I think it was called *Winet.*" *Vide* Bede, anno 665, "In regione Leedis, juxta flumen Winwed."*

Bede says the battle was fought near the river Vinwed, which then, with the great rains, had not only filled its

Mercian kings. I am satisfied now that the battle on the river Winwæd, in which Penda was defeated, was at Kirkstall. St. Oswald's victory over Cadwalla was twenty years earlier than this, and its scene is clearly marked by Ven. Bede. In his time it was named *Hefenfelth,* and a stream ran by it called *Denisesburn;* it was close to the wall, north of it, and it was near to Hexham; circumstances which leave no doubt as to its identity with St. Oswald's Chapel, three miles from Hexham, and a stone's throw north of the wall. It is wrong to say that St. Oswald vowed to build a church on the spot. He simply raised a cross before the battle, and this cross remained long afterwards. Eventually a church was built where the cross had stood; but the time of the erection of this church was not long before A.D. 731, when Ven. Bede wrote his history. Methley has no more to do with the personal history of St. Oswald than any other parish where a church was consecrated to his memory."

* Thoresby's *Correspondence,* vol. i., p. 233.

channel but overflowed its banks, so that more were drowned in the flight, than destroyed by the sword.*

Archdeacon Nicholson, in a letter on the same subject to Thoresby, December 8th, 1694, says: "But what I pray you is the meaning of these words of Bede (Book iii, chap. 24), 'near the stream Vinved,' which the Anglo-Saxon translator has rendered 'near Winwed stream'? and what is the meaning of the proverb mentioned by Flavilegus—'In Winwed river was avenged the death of Annæ, &c.'? P. Cressy boldly asserts, in Roman manner, that there is to be found near Leeds a village *Winfield*, but this is a fable of his own. There is certainly a place—Winmore—four miles from that town, on the road leading to York; and the scholars and antiquaries imagine this to be the place of the battle. In my opinion, the 'Winwed fluvius,' in Bede's Latin, seems to be what is now called the Aire, which flows by the town of Leedes. Meanwhile, let the inhabitants of the locality ascertain if there be any stream or brook with a name like that."†

Speed, in 1676, says, "Near unto Kirkstal, Oswie, king of Northumberland, put Penda, the Mercian, to flight; the place wherein the battel was joyned the writers call Winwid Field, giving it the name by the victory. From which it would appear there was no particular place called Winwid-field, but that the spot was henceforth called the Field of Victory," or the field connected with the flight across the Winwid, to commemorate the conflict; which may have extended by both Meanwood and Weetwood to Kirkstall, at that period, doubtless, a continuous tract of moorland and wood. Speed is also recorded to indicate on his map the

* "Et quia prope fluvium Vinwed, pugnatum est qui tunc præ inundantia pluviarum late alveum suum, imo omnes ripas suas, transierat, contigit ut multo plures aqua fugientes, quam bellantes perderet ensis."—Bede, *Hist. Eccle.*, by Giles, Book iii, c. xxiv, p. 354.

† Thoresby's *Correspondence*, vol. i.,p. 185.

battlefield near Kirkstall Abbey; and the Rev. Mr. Haigh shews that it appears, from a charter in the Monasticon, there was at the west end of the bridge at Kirkstall, and nearest to Weetwood, a piece of land called Winnet, corresponding to Wynnet and Wynnod of two Welsh versions, and to the Winwed of Bede.

So that it appears to me, as far as ancient records and traditions are to be depended upon, we have ample evidence the battlefield of Gai, Giti, or Witi, was at Weetwood, and that the subsequent flight and loss of Penda's army was in the attempted passage of the Aire at Kirkstall.

It has been asserted, however, that stone implements were used in this country so late as the battle of Hastings (A.D. 1066), and, therefore, we need not go so far back into the past to account for their occurrence or their fabricators; but as Mr. Evans very justly remarks: "Whoever reads William of Poitiers' account of that battle, will find that his words are: 'Jactant lignis imposite saxa,' which seems to imply rather that certain stones were thrown from the end of wooden instruments, than that the stones were used either as spears, arrows, or lances."

The mere fact of stone implements, of whatever kind, having been used at the battle of Hastings, does not invalidate other specimens having a far more remote antiquity, as, probably, that might have been nearly if not the very last occasion on which stone implements were used for defensive purposes in England; and, also, as the employment of such implements had been transmitted down through successive generations, their earliest use would be lost in the lapse of ages, or might be confined to particular localities, which appears to have been the case with some of the Indian tribes. In the *Proceedings of the American Philosophical Society** there is a very interesting communication from

* Vol. x., 1867, p. 352.

Mr. F. V. Hayden, of his discovery of fragments of pottery, flint flakes, arrow-heads, &c., in the refuse of an Indian village. He says, "On a recent visit to the Pawne reservation at Loup Fork, I discovered the remains of an old Pawne village, apparently of greater antiquity than the others, and the only one about which any stone implements have yet been found. On and around the site of every cabin in this village I found an abundance of broken arrow-heads and chipped flints, some of which must have been brought from a great distance, and a variety of small stones which had been used as hammers, chisels, &c. I gathered about half a bushel of the fragments of pottery, arrow-heads, and chipped flints. No Pawne Indian now living knows of the time when this village was inhabited. Thirty years ago an old chief told a missionary that his tribe dwelt there before his birth; but he knew nothing of the use of stone arrow-heads, though he said his people used them before the introduction of iron. This discovery is interesting, as it is the first tribe that I have ever been able to find connecting the stone age with the present in the Missouri Valley. I have asked the most intelligent Indians of more than twenty tribes in this valley, 'How far back in the past the Indians used stone arrow-points?' and I have received but one answer. They would point towards heaven and say, 'The Great Spirit only knows; we do not.'"

In conclusion, I would remark it is very probable there are several other localities in the neighbourhood that have been occupied by the early Britons, of which we have no record, as three instances bearing upon this point have come under my notice within the last two years. In 1867, a fine example of an early British uninscribed gold coin was found in a turnip field at Badsworth, near Pontefract, and is now in the possession of John Moore, Esq., of Moor House. On one side of this coin was a very rude disjointed representation

of a horse, and on the other an equally rude attempt at the Macedonian Phillippus. The type, however, is not exactly that of the usual British coins found in Yorkshire, but rather of those which Mr. Evans thinks may belong to the South Midland district (Plate A, fig. 13), or some tribe with whom the Brigantes might have come in contact; and this solitary example may not have been the only coin which has occurred, but the only one preserved, as such treasure-troves are too frequently sold to prevent a claim being made. During the same year, also, a massive gold armilla, whose value as old gold was £18, was found within a few miles of Leeds, and offered to me for sale; but, for the reason alluded to, the exact locality was withheld, unless I became the purchaser; and, lastly, in the autumn of 1868 an example of gold ring-money or rude ear-ring, weighing 336 grains, was found in a ploughed field at Cawood, which also passed into the hands of a goldsmith at Leeds. We must therefore conjecture, I presume, in each case, these sites to have been British stations, or at least local occupations, or that the first had been dropped by some soldier of the Roman legions in crossing by the fifth or eighth Iter, both of which passed near Pontefract, and who had acquired it by conquest from the Britons with whom he had come into contact in traversing the county.

Whether, however, the neighbourhood of Adel has been the site of the particular occurrences to which I have alluded or not, it is very evident from the limited space in which the flint implements and flakes have hitherto been found, they must have been manufactured on the spot by the Britons to meet some special necessity; and should the soil at Weetwood and Meanwood eventually be found to contain similar articles of this early period, it will afford additional evidence that the conjecture I have adduced for their occurrence is not beyond the bounds of probability.

PROCEEDINGS

OF THE

GEOLOGICAL AND POLYTECHNIC SOCIETY

Of the West-Riding of Yorkshire,

AT THE SEVENTY-FOURTH MEETING, HELD IN THE TOWN HALL, PONTEFRACT, ON THURSDAY, NOVEMBER 4TH, 1869.

The Right Hon. Lord Houghton, D.C.L., F.R.S., and F.R.S., Lit., Vice-President of the Society, in the Chair.

Lord Houghton, in opening the proceedings, said: This is the seventy-fourth meeting of the Geological and Polytechnic Society of the West-Riding of Yorkshire. The Society was founded originally at a meeting of the great coalowners of this important district, covering as it does an area of something like 500 square miles, for the object, at first, of inquiring into the science of mineralogy, and bringing to bear on that great department of British industry all the resources of science; but as the meetings went on it was suggested that they should be extended to other subjects of a cognate character, embracing archæology and history, though the Society remains in its foundation, mainly, geological, and it is to geological objects one would wish it to be chiefly applied. You know, and it is not for me to tell you, how interesting a field of geology is presented to us in this great county to which we have the honour to belong; and receiving, as we do, such a large amount of material profit from its mineral products, and perceiving, as we do, day by day, that all the beauty of nature is passing away under the dominion of smoke, we nevertheless feel that we must make

the best of it; and if we cannot keep our flowers and sheep clean, at any rate the next best thing we can do is to get as much coal as we can, of the best and cheapest kind possible. There are other mineral interests besides that of coal, connected with this county, the development of which requires considerable study and information; and I should be very glad if either now, or at any future meeting of this Society, attention should be drawn to these other elements of wealth. I came just the other day from the North-Riding of Yorkshire, where I saw the wonderful development of ironstone which has taken place in the neighbourhood of Middlesborough. There, by the chance discovery of a gentleman who was out shooting some twenty-five years ago, in taking up a piece of stone which from its appearance he believed to contain iron, which somehow or other could be got out of it; by the development of the same idea which had taken place in many minds, and the application of the industry and acuteness of an engineering population, there had risen up, almost as quickly as Chicago, or any of the other wonderful cities of America, the town of Middlesborough, in the North-Riding of Yorkshire. But, for the amusement of the Society, I cannot say that I regret that we shall not be kept in the domains of science, but be enabled to consider archæology and history. We have a paper from Mr. Surtees, that most enterprising and ingenious antiquary, in which he undertakes to show us the real meaning and history of the name of the town in which we are now met. I don't know how he is going to do it. But he is a clever man, in fact the only fault about him is that some people think him rather too clever. It is not for me to find fault with Mr. Surtees, but there may be a little bit of poetry about his antiquarianism; and he is supposed, not only here, but on the other side of the water, as they say in America, to combine a certain amount of fancy with his historical researches. It is not for me to say

whether this is so or not, particularly so before we hear the Paper, nor indeed afterwards should I undertake with my limited knowledge to do so, because we all know that some discoveries that have seemed extravagant, and almost impossible, when first suggested, have been found, when more closely investigated, to be well supported. We are also to have what, no doubt, will be a most interesting Paper on the "Pre-historic Monuments of Brittany," by the Rev. W. C. Lukis, rector of Wath, near Ripon. This suggests to me how much we regret here the absence of the President of this Society, Earl de Grey and Ripon, he being occupied in continued Cabinet Councils, in which he is determining how this country is to be governed (or misgoverned, I will not say which, because we here meet with different political opinions), but we nevertheless know that he has applied his serious mind to grave subjects with the best possible intentions, and I hope with the best possible results. The last Paper, I am sorry to say, is not to be read; but instead of it, Mr. John Ffooks has sent a request to be made a member of this Society. Mr. Walter Rowley, mining engineer, of Leeds; Mr. Banks, solicitor, and Mr. J. D. Greaves, mining engineer, Wakefield; also wish to be elected members, to which I have no doubt you will assent. It will afford me great gratification to receive the names of other members. The subscription is of a peculiar character, being 13*s.* per annum. I have suggested to Mr. Denny that it should be made £1, which would look more respectable—(laughter)—and I have no doubt he would get more money.—The following gentlemen's names were then added:—The Right Honble. J. Parker, of Darrington Hall, Pontefract; J. H. Barton, Esq., of Stapleton Park, Pontefract; Edmund Lord, Esq., East Hardwick, Pontefract.

The Chairman concluded by calling on Mr. T. W. Tew, of Carleton, near Pontefract, to read his Paper

ON THE ROCKS OF THE NEIGHBOURHOOD OF PONTEFRACT; WITH SOME OBSERVATIONS ON THE DISCOVERY OF SOME BONES OF THE BOS PRIMIGENIUS (LONG-FRONTED OR SHORT-HORNED OX).

In presuming to submit a Paper to this meeting of the Geological and Polytechnic Society of the West-Riding of Yorkshire, I do so with feelings of considerable diffidence, having so recently been admitted a member of your Society, and being but a mere amateur in the study of Geology.

But before proceeding further, I must express the gratification felt by my fellow-townsmen at the selection of Pontefract for a third, if not a fourth, visit from the Geological Society of the West-Riding, and the great pleasure derived from seeing the noble lord occupying the chair; and I beg to offer on their behalf a cordial welcome both to him and to the members of the Society.

I have, in preparing this Paper, done my best by the collection of facts to accomplish the task intrusted to me by Mr. Henry Denny, A.L.S., the General Secretary, that of making "Some Observations on the Rocks of this Neighbourhood, and the Discovery of some of the Bones of the *Bos Longifrons*, the long-fronted or small Fossil Ox." Lord Houghton has stated, to quote one of his poetical effusions, that

> "To our instructed, patient, seeking eyes,
> Each day reveals the outer world more clear."

And this result has doubtless been greatly advanced by following the noble lord's advice to those who meet again after travel:—

> "Then talk with fair exchange, share all your gains."

I therefore proceed with the more confidence to offer my gleanings from the field of science, since it is in the collection of facts by humble contributors that the necessary materials are found to unravel geological problems, and to test the truth of the different theories which are advanced to explain the mysteries of nature.

Pontefract, selected as the place of meeting this afternoon, is destined to become of considerable importance as a coal town, not only to the mere capitalist who digs down into the bowels of the earth in search of mineral treasures, for the sole purpose of converting them into wealth, but to the mining engineer and to the student of natural science, of which Geology forms a branch.

The town seems almost to have been destined, from the elevated position nature has given it on the top of a silicious sandstone rock, as a central point of observation, from which not only can the rocks of the surrounding country be surveyed, but local objects of archæological and historical interest be best examined.

If you will now follow me on these maps, directing your eyes from the sun setting to the sun rising, the country around you presents these geological features: — On the West, commencing with the Millstone Grit at Halifax, by Wakefield, Sharlston, Snydale, Purston Jaglin, and terminating near Pontefract Cemetery, range the carboniferous rocks, or more ancient geological records of the country. Under our feet, at Baghill, Glass Houghton, Marlpit Hill, Mill Hill, Wentbridge Hill, and Hawthorn Cottage, are the lower Permian Red Sandstones of Smith and Sedgwick. A little towards the East, at Kirk Smeaton, Brockendale, and Darrington, are the Lower Magnesian; at Womersley, Brotherton, and Garforth, the rocks of the Upper Magnesian Limestone, or middle period of the geology of the district; whilst the country about Fenwick, Birkin, and Chapel

Haddlesey, are the sand, alluvium, and gravel beds of a tertiary formation.

Since the year 1840, when the Rev. William Thorpe, of Womersley, read at Doncaster, on the 2nd December, on the occasion of the twelfth quarterly meeting of this Society, his valuable and able Paper on "The Agriculture of the West-Riding of Yorkshire, considered Geologically," twenty-nine years ago, perhaps in no previous period of equal duration has so great a progress been made, in this division of Upper Osgoldcross, in improved methods of cultivating the land, by the application of artificial manures and mechanical contrivances, and in the pursuit of the study of Geology. The railways of this Riding, and more particularly the two branches of the Lancashire and Yorkshire railway—the lines to Goole and Methley, which pass by this town—have chiefly been constructed and opened since Mr. Thorpe read his Paper; whilst intimately connected with this railway system the coal fields on the west of us promise, through such enterprising mining proprietors as the Messrs. Pope and Pearson; Rhodes and Dalby; Ellis and Broadbent; Shaw and Son; and Mr. W. H. Wilks; in a few more years to change the character of Pontefract from a quiet agricultural market town to become the centre, and the heart and lungs of an important mining district.

For the future increasing prosperity of this town and neighbourhood, we must look upon our coal fields as the great material source of power and wealth. In this country coal is the great source of power and wealth. The wood of England was burnt up long ago, and now there is not timber sufficient for the carpenter and the joiner, let alone for household use. In fact almost everything we do is done more or less by the use of coal: a fact which cannot surprise us if we look to what coal is, in its chemical and physical nature. It is a kind of spring and store of forces which can be let go

whenever we please. Sir W. Thompson, the great electrician, has suggested that "where there was a kind of force which could be wound up and let go at any moment, and whenever we liked, and be turned into energy, as in the case of a clock, it should be called 'Potential Energy.'" Now, of all forms of potential energy, the most wonderful is coal. If we take one cwt. of coal, and let off all its force suddenly, as when we would let off a watch spring, and use this force in raising the coal up, it would shoot up more than 2,000 miles high, even if the force of gravity acted the whole distance; or it would raise 112,000,000 lbs. of coal one foot high.

This force is turned into use by means of heat, and this is the power used in reducing metals, and for almost every chemical change that takes place; while we have the inventions and improvements of Watt and Stephens on the steam engine, stationary and locomotive, to turn it into mechanical motion.

Every improvement of Mr. Fairlie in the steam engine must increase the power of coal; every invention for consuming smoke and preventing the waste of heat, is a step in this direction; and every cook who husbands the use of coal in her kitchen fire, contributes indirectly to the support and prolongation of the greatness of the British empire. For if water-power and wind-mills cannot compete with coal now, what are the chances that they will ever again be able to do so, when science is every day making coal more powerful? We must in truth now regard water-wheels and wind-mills as mechanical inventions of a bygone age.

The consumption of coal within less than sixty years has probably increased sevenfold, while the increase of wealth and population has been proportionate. If this consumption of coal continues to increase at such a rate, the production of coal must keep pace with it. In a few years' time perhaps even horse-ploughing, and reaping with scythes and

sickles, and threshing with flails, will be looked upon like water-wheels and wind-mills as obsolete contrivances; and on farms, the introduction of the Wakefield Ploughing Company's steam ploughs and reaping and threshing machines, will be universal; while in the pumping of sewage, and in a hundred other different ways, steam and coal must come into general use. Nothing but a rise in price will ever check this demand for coal.

But coal is also the great agent in giving value to mineral products. The extreme importance of coal in this respect to this country is partly shown by the circumstance, that the value of the metals produced from the mines of the United Kingdom, in 1868, is estimated at £15,736,416 sterling. Iron ore was raised to the extent of 10,169,231 tons. From this ore was obtained 4,970,206 tons of pig iron. And for minerals not smelted, including salt and barytes, &c., a further value may be added of £2,003,819 of money.

America has the largest coal field in the world, comprising an area of 310,500 square miles, whilst that of Great Britain is only 6,300 square miles; so that the moment this country ceases to command more abundant and cheaper coal and iron than her neighbours, the United States and other countries must increase in power and wealth, and we must be passed in the race of competition.

We ought, therefore, to be anxious to ascertain the extent of our mineral treasures, and to use our present means of potential energy and wealth to the best advantage.

It is to the probable extent and value of the coal fields surrounding us, that I wish now to direct your attention.

This large map will, I hope, give you some idea of the potential energy and wealth surrounding this town on the west. It illustrates a portion of the West Riding coal field—a fragment only of one continuous series of the Great Northern coal field,—Lancashire, Newcastle and Colebrook Dale.

In ascertaining the quantity of coal yet unworked, Mr. Rowland Childe, Mining Engineer, of Wakefield, has favoured me with the following calculation. He has taken out of the twenty-two beds of coal, found in boring through the coal measures to the Millstone Grit, on the top of which they rest, the most important beds, sixteen in number, to a depth of 600 yards. But with respect to the six thinner seams, he has confined the depth to a distance from 200 to 400 yards from the surface, according to the quality and thickness of the coal.

For the purpose of this calculation, he has assumed this coal field to extend from the outcrop of the Halifax beds—the lowest series of beds in the coal measures—on the North, to the river Don, near Rotherham, on the South; and from near the outcrop of the Magnesian Limestone on the East, to the outcrop of the Halifax beds on the West, comprising an area of 550 square miles. Dividing this area into two divisions, he estimates the unworked coal on the North side of the Lancashire and Yorkshire Railway to be 1,817,310,620 tons, as on the sixteen following beds:—

Name of Bed of Coal.	Thickness. ft.	ins.	Quality of Coal.
Shale Coal	2	0	First Class House Coal.
Stanley Main or Beamshaw	6	0	House and Smelting Coal.
Barnsley Bed or Gawthorpe	3	6	House and Engine Coal.
Swallow Wood or Haigh Moor	4	6	Excellent House Coal.
Joan or Mitchell Coal	2	8	House and Steam Coal.
Flockton Thick, or 40 yards Coal	2	0	House and Engine Coal.
Park Gate or Brown Metal	4	0	Ditto ditto.
Little or Green Lane Coal	2	6	Steam and Smelting Coal.
Middleton Main	4	3	House, Gas and Engine Coal.
Wheatley Bed	3	0	Engine and Lime Coal.
Blocking Coal	1	10	House Coal.
Beeston, or Shirtcliffe	3	10	House and Engine Coal.
Low Moor Black Bed	1	10	Ditto ditto.
Low Moor Better Bed	2	4	Best Smelting Coal.
Halifax Hard Coal	2	3	House and Engine Coal.
Halifax Soft Coal	1	6	Ditto ditto.

And the unworked coal south of the Lancashire and

Yorkshire Railway to the River Don, he also estimates at 2,940,382,800 tons, in the seventeen following workable beds, making a grand total of 4,757,693,420 tons, or for the sake of popular illustration, equivalent to a bed of coal of nearly twelve feet in thickness, over the whole area of this coal field of 550 square miles.

NAMES OF BEDS OF COAL SOUTH OF THE LANCASHIRE AND YORKSHIRE RAILWAY, TO THE RIVER DON.

ABOVE THE ACKWORTH ROCK.

The Nostel Coal.
The Crofton Top Coal.
The Crofton Low Coal.
The Woodmoor, or Weithwood, or Melton Field Coal.

The Winterbed, Shale, or Abdy Coal.
The Stanley Main, Beamshaw, or Kent Thin Coal.
The Mapplewell, or Kent Thick Coal,
The Barnsley Bed, or Warren House Coal.
The Haigh Moor, or Swallow Wood Coal.
The Flockton Thick, or Forty Yards Coal.
The Brown Metal, or Park Gate.
The Silkstone Coal.
The Whin Moor Bed.

AND PART OF THE DISTRICT.

The Low Moor Black Bed.
The Low Moor Better Bed.
The Halifax Hard Coal.
The Halifax Soft Coal.

But there is also a large and extensive coal field on the S. E. and S. of Wakefield, and E. and N. E. of Barnsley, which is practically only just now being approached. This coal field comprises an area of eighty square miles, and it contains very valuable seams of coal.

Taking, therefore, the total quantity of coal raised in Yorkshire from 441 collieries at 9,740,510 tons per annum, the coal field of this part of the county of 550 miles area will require, according to last year's consumption, nearly 489 years to exhaust it, or it would supply the whole demands of the United Kingdom (from 2,992 collieries actually at work in 1868, which Mr. Robert Hunt, the Keeper of Mining Records, states was 103,141,157 tons,) for about forty-seven years.

Mr. Rowland Childe's large diagram represents a true section of this West-Riding coal field, which is twenty-two miles in length. It is drawn to a longitudinal scale of six inches to one mile, and vertically sixty feet to one inch. It is taken from the Kirkburton colliery on the S. S. W., by the Emly Moor, Flockton, Denby Grange, Ossett, Round Wood, Methley, Kippax, and Garforth collieries, to near Micklefield on the N. N. E.

The thick black lines in the section are the coal beds in the carboniferous rocks, and the vertical ones the faults, throws or dislocations, breaking through the coal measures, forming walls between them, and dividing them into chambers.

From Kirkburton to near Wakefield is the first great chamber or field of coal, the seams in which dip down eastwards considerably below the surface of the ground. From Wakefield to Methley the beds of coal lie nearly level. From Methley to Kippax they are concave or slightly dish-shaped. From Kippax to Garforth the beds of coal rise very rapidly again to the ground, until near Micklefield they crop out nearly at right angles, or unconformably against the Magnesian Limestone.

At the Kirkburton colliery the Halifax soft coal, the lowest bed in the series of coal measures resting on the Millstone Grit, could be reached by the shaft of that pit at a depth from the surface of the ground of about 303 yards. At the Victoria colliery, near Wakefield, that bottom bed would require a shaft to reach it of 767 yards, whilst under the Pontefract Park it will probably be necessary to sink 1,016 yards to exhume the coal, and at the Denaby Main colliery 1,204 yards; until at a little distance N. N. E. of Micklefield, the Low Moor and Halifax beds crop out altogether against the Magnesian Limestone, and beyond that point, and in that direction, no coal would be found.

This other section of this coal field on the South side of the Lancashire and Yorkshire Railway is taken in the line of the longitudinal fracture of the coal deposit dipping under the Magnesian Limestone. This section is twenty-seven miles in length. It commences at Halifax with Beacon Hill, due W. and E. to Chevet Hall, then by Ackworth Moor top to Baghill and Brotherton. In the line of this section the Lower Permian Red Sandstone and Magnesian Limestone formations slope against the coal beds of the carboniferous rocks, occupying a position geologically more conformable than in Mr. Childe's section; that is, side by side with each other.

I have now come to the chief point to which I would draw your attention—the probable existence of coal under the Magnesian Limestone formation; Mr. Woodhouse, no mean authority, observing of this part of the coal field on the E. and S. of this line of longitudinal fracture, that it was within the last few years supposed that it terminated wherever it was overlapped by the Magnesian Limestone or New Red Sandstone formations, and that it was chimerical to expect to find coal near Worksop or Conisbro'. But near Worksop the Barnsley or Warren House bed of coal, the third marketable seam in our West-Riding series, is now being worked at a depth of 610 yards below the surface of the ground, and 450 yards below the lowest bed of limestone.

At the Denaby Main colliery, the deepest pit in Yorkshire, as well as the most easterly, southwards, the Barnsley bed of coal is worked at a depth of 449½ yards from the surface. The dip of the strata is to the E. or perhaps N.E., and thickness of bed 7 ft. 8 in, to 8 ft. 9 in. If at this colliery, seventeen miles S. S. E. from Brotherton, coal can be profitably worked at a distance of half-a-mile from the Lower Magnesian Limestone, and only one and a half miles from Conisbro' Castle, may not coal eventually be found under the

Magnesian Limestone formation at Owston, Carcroft or Knottingley, or even still further eastward at Reedness, or a little to the southwards of the neighbourhood of Selby? At Dukinfield, in Cheshire, the shaft to the bottom of the "Black Mine Bed" of coal is 690½ yards from the ground, and this is the greatest depth at which coal is at present worked.

Mr. Bingham, at Ince, near Wigan, has just proved a seam of coal known as the Arley, at the depth of 810 yards. When the dib-hole at the bottom is sunk, this shaft of the deepest colliery in Lancashire will be 820 yards from the surface. At Owston and Carcroft, trial holes have already pierced through the Magnesian Limestone to a depth of 90 yards, and at Reedness, near Goole, another bore hole has been driven through the sandstone to a depth of 314 yards. If these trial holes should be continued, and coal struck, they will prove the truth of the theory of Mr. Woodhouse.

Between Woodlesford and the town of Pontefract the map is crossed by four diagonal lines. These lines mark the directions of the faults, throws, or dislocations breaking this coal field between Woodlesford and Pontefract on the N. E. side of the Lancashire and Yorkshire Railway, into five separate divisions. From Methley Hall to near Allerton Colliery the throw up to the North is 70 yards; from near Altofts to the Leadstone pinfold the throw up to North is again 70 yards; and from the Bay Horse Inn, Warmfield, to Newton Colliery, the throw down to south is 90 yards; the throw by Pontefract Park being not yet proved.

At the Stanley Hall Estate the Stanley Main bed of coal is reached at a depth of 120 yards, and at Heath Common, 156 yards below the surface of the ground.

In the Methley division, at the Fox Holes Collieries, the Stanley Main is reached at 130 yards, and at Allerton Bywater at 127 yards.

In the Whitwood division the Stanley Main is reached at Whitwood Collieries at 70 yards; West-Riding Collieries at 79 yards; Sharlston Collieries at 334 yards; Bateson's Collieries at 84 yards, while at the Castleford Bore Hole the same bed is reached at a depth of 96 yards.

Similarly in the Merefield division, at Snydale, on the estate of Mr. Torre, at 175 yards; at Flass Hole at 127 yards; Victoria Colliery of Messrs. Rhodes and Dalby, at 225 yards; at Mere Field (Glass Houghton), at 170 yards; and at Wheldale Colliery at 115 yards.

And in the Pontefract division, at the colliery of Messrs. Shaw and Son, the Stanley Main is reached at 250 yards; while Messrs. Rhodes and Dalby hope to strike this seam of coal at Abbot's Close, near Pontefract Park, at 184 yards.

It is open to discussion as to whether these Stanley Main beds lie very conformable in these divisions of the coal field, as the depth at which they are reached varies so greatly, and at such comparatively short distances from the different collieries. But the depths to the Haigh Moor and deeper seams of coal suggest a more uniform degree of conformity to perhaps within a few yards, the beds thickening and improving in quality towards the S.E. On the Stanley Hall estate, the Haigh Moor coal is reached at 287 yards below the surface; at the West-Riding Colliery, at 232 yards; at the New Park, Alverthorpe, at 132 yards; at the Wheldale Colliery, at 285 yards; at Mere Field Colliery, at Glass Houghton, at 347 yards. This magnificent bed of coal is here for use, and fit for any domestic purpose whatever; the solid coal being four feet seven inches in thickness. This seam lies either level or, which is more probable, follows the dip of the Wheatworth bed above it, which is S.E. by S. The coal measures here yield fine specimens of *Stigmaria Fucoides* and *Calamites*.

I think that if a line was projected from Mere Field,

following the dip of the strata in a south easternly direction, it would be possible to estimate the depth the coal measures lie under the Magnesian Limestone formation at Owston and Carcroft. Now this dip below the horizon cannot exceed three degrees, and if the new shaft near Pontefract Park should strike this coal at about 361 yards it would still further prove the truth of the theory of Mr. Woodhouse and other mining engineers, that the Haigh Moor and lower beds of coal attain their maximum depths near this town, or probably extend further East on the S.E. side of the Lancashire and Yorkshire railway, dipping conformably under the Magnesian Limestone and New Red Sandstone.

There is one topic of absorbing interest to Pontefract, in the efforts lately made to obtain by Act of Parliament the coal under the Park. In the twentieth year of the reign of his Majesty King George the Third, an Act of Parliament was obtained for dividing and enclosing round Pontefract what from time immemorial had been an open pasture of about 1,300 acres of land. Over this pasture the burgesses of Pontefract and Tanshelf had the right of stray free of cost. This Act of Parliament narrowed the Park to its present dimensions of about 325 acres of land. On this enclosed portion the King's Majesty was dispossessed of all titles, rent charges, coals, and other minerals, in short of the freehold. But by a clause in the Act, the governing body, called the Park Trustees, were debarred from any power of getting coal or other minerals, or in any way breaking up the surface of the soil. The near approach of collieries to this Park suggested the desirability of repealing the mineral clause of the Act of 1780, and this year another Act of Parliament has been obtained which repeals the debarring clause of 1780—and by its 27th clause confers additional powers on the Park Trustees and Street Commissioners, and authorises those governing bodies to dispose of the coal. This coal has now been let,

and as preparations for sinking a shaft near the Park are being made, it may interest you to know the probable amount of "potential energy" lying under its surface. The Haigh Moor and the deeper beds of coal are estimated to contain 6,987,500 tons of coal; and if this estimate be an approximate value of the coal under the Park we must regard it as a vast magazine of power and wealth and of potential energy stored up in the bowels of the earth for the use and benefit of the inhabitants of Pontefract, and at a period of time immeasurably distant from our own.

ESTIMATE OF TONS OF COAL UNDER THE PONTEFRACT PARK.

Thickness of Bed.	Name of Bed.	Depth in yards.	Description of Coal.	Estimated produce in Tons per Acre.
Ft. Ins.				Tons.
4 4	Haigh Moor	361	First Class House Coal	5,200
	Depth from H. M. to			
4 0	Middleton Main	200	House, Gas and Engine Coal.....	4,800
	Depth from M. M. to			
2 0	Beeston Coal.....	90	House and Engine Coal	2,400
	Depth from B. C. to			
2 4	Low Moor Black Bed	85	House and Engine Coal	2,800
	Depth from L. M. B. B. to Low Moor Better			
1 6	Bed.....	40	Best Smelting Coal	1,800
	Depth from L. M. B. B.			
2 3	to Halifax Hard Coal	220	House and Engine Coal	2,700
	Depth from H. H. C.			
1 6	to Halifax Soft Coal	20	House and Engine Coal	1,800
17 11		1,016	Tons per Acre...	21,500
100 Tons per Inch per Acre.			Acres ...	325

21,500 Tons per Acre.
325 Acres.

6,987,500 Tons under Park. Tons... 6,987,500

I cannot but refer to George Stephenson, the railway engineer, whose philosophic mind, unaided by theoretical knowledge, rightly saw that coal was the embodiment of power originally derived from the sun. That small pencil of solar radiation which is arrested by our planet, and which

constitutes less than the 2,000th-million part of the total light sent forth from the sun, must be regarded as the power which enabled the plants of the carboniferous period to wrest the carbon they required from the oxygen with which it was combined, and eventually to deposit it in this neighbourhood, and under this Park, as the solid material coal. The Park Trustees hope the day is close at hand when the re-union of that carbon with oxygen shall restore the energy expended in the former process, and thus enable them to utilise the power originally derived from the luminous centre of our planetary system. The Trustees of this Park may be congratulated on obtaining an amendment to two previous Acts of Parliament, and of the prospect of shortly uncorking this bottled-up sunshine, and adding Pontefract as a coal town to others in the Riding, thus contributing to the power, wealth, and potential energy of the United Kingdom.

MAGNESIAN LIMESTONE FORMATION.

If towards the sun-setting Pontefract is surrounded geologically by a vast coal-cellar, the town is equally fortunate in being bounded towards the sun-rising by the mighty formation of the Magnesian Limestone. The rocks of this formation may be divided into five bands or layers; the lower yellowish magnesian rocks, resting towards the west on a fringe of the Permian Red Sandstones of Smith and Sedgwick. The upper thin-bedded rocks are separated from the lower limestones by a bed of red marl, and overlapped in some places by layers of marls and grits. This magnesian formation may be called the backbone of Osgoldcross. It runs right through the two wapentakes nearly from south to north. It varies in breadth from three to four and a-half miles, and it is from eighty to one hundred yards thick.

At Brotherton, Knottingley, Cridling Stubbs, and Womers-

ley, the limestone is burned and sold for agricultural purposes. It has the property, when put upon land, of pulverising strong soils, and, to use a farmer's phrase, of fastening or cementing light ones; the Knottingley bed of limestone being held in high estimation by the farmers of the East Riding of Yorkshire and Lincolnshire. From the quarries at these places, and from South Elmsall, 100,000 tons of lime and limestone are annually sent away.

The limestone in the quarries about Pontefract, and also upon the estate of the Right Hon. Lord Houghton, at Glass Houghton and at Wheldale, is burnt into lime, and extensively used for building purposes throughout the kingdom; Wheldale lime being held in great favour by many architects for its cementing properties. The commercial value of the different beds of limestone varies considerably, but in the neighbourhood of Knottingley from £400 to £600 per acre is the marketable price. There is indisputable evidence in the fossils *Mytylus Squamosus, Terebratula Elongata, Axinus Truncatus, Nautius Frieslebeni,* and by chemical analysis, that the sea once inundated the area of the country now covered by the magnesian limestone formation, and that from some unknown cause the waters of the ocean were then decomposed in such a way as to permit very generally the precipitation of united magnesian and calcareous carbonates.

The analysis of the lower rock near Stump Cross gives as under:—

Carbonate of Lime	58·88
,, Magnesia	33·96
Sesqui-oxide of Iron	·83
Alumina (Soluble in Acid)	1·87
Siliceous Sand (Insoluble Residue)	4·04
Moisture, &c.	·42
	100·00

But the lower Permian Red Sandstone of Sedgwick and Smith, which forms W. a fringe to the magnesian limestone,

has also its value in the commercial world as well as to the geologist and to the chemist. This rock of Pontefract is the geological problem of the neighbourhood, and which is by no means solved. The facts at present known seem to show that it rests in some places unconformably on the upper beds of the coal measures, and that this sandstone rock was laid down upon the edges of the previously formed strata, so that this lower sandstone overlaps sometimes upon one layer and sometimes on another in tumultuous confusion, as may be seen at Glass Houghton, upon the carboniferous rocks.

From the different quarries between Darrington and Glass Houghton, 31,000 tons of this sandstone rock are annually excavated and sent to all parts of the country for use at the different iron foundries for moulding castings.

Darrington and Pontefract	840
Monkhill	17,640
Glass Houghton	12,520
Total Tons	31,000

These sand quarries are full of the bones of extinct animals, and the sand, from chemical analysis, would appear to owe its origin to the action of fresh water, as under :—

Mill Hill Rock.	
Carbonate of Lime	1·00
,, Magnesia	·55
Sesqui-oxide of Iron	1·78
Alumina (soluble in acid)	·72
Insoluble Residue (Siliceous Sand)	94·42
Moisture, &c.	1·53
	100·00

Monk Hill Rock. (*Bos Longifrons.*)	
Carbonate of Lime	4·46
,, Magnesia	2·89
Sesqui-oxide of Iron	2·33
Alumina (soluble in acid)	4·12
Insoluble Residue (Siliceous Sand)	83·60
Moisture, &c.	2·60
	100·00

BOS LONGIFRONS.

It was on the 29th of April, 1869, while some men were excavating this sand at Monkhill, that the bones of an animal were exhumed. At a depth of about twelve feet from the surface of the ground they saw what appeared to be

the skull, jaws, and horns of some creature. They got out some of the teeth, horn cores, and other bones, when the soil above them fell into the sand pit in which they were digging, and the remaining bones were again buried.

The bones and teeth taken out of the pit, and which I now produce, have undergone disintegration from exposure to the atmosphere. That the animal to which these bones belonged fed upon herbage such as Pontefract Park might once grow, I think the teeth confirm. That it was an animal somewhat smaller than the present race of oxen, the *Humerus* and *Scapula* indicate. That it was a short-horned animal the horn cores sufficiently testify. Although the skull, jaw, and ribs are wanting, Professor Owen, who has examined these bones, identifies them as the bones of the *Bos Longifrons*, Long-Fronted or Small Fossil Ox.

No whole skeleton of this animal has ever been found—its bones have been dug up with those of the Reindeer, the *Bos Priscus* and the *Bos Primigenius*, and with Roman antiquities; from which it is inferred that this fossil species continued to exist after every other Pliocene Mammal had died out. It was but the other day that the thigh-bone of one of the extinct species of deer which existed in this country in pre-glacial times was found in a crevice of limestone at South Elmsall, and I found another at Monkhill, near the *Bos Longifrons*. There is evidence, then, that the *Bos Priscus*, *Bos Primigenius*, and the *Bos Longifrons*, whose fossil histories date from the time of the Mammoth, continued to exist in this island not only after it became inhabited by man but after it was conquered by the Romans. Perhaps this small short-horned newer *Pliocene* ox is still preserved in the mountain varieties of our domestic cattle; if so, the *Bos Longifrons* forms the connecting link between man's appearance with the present race of domesticated animals, and the wonderful changes which have taken place in pre-historic Mammalian Fauna,

down to the humblest organism yet discovered, the *Eozoon Canadense* of the British North American Laurentian Beds.

The conclusion of this Paper was followed by several rounds of applause, which were broken by the noble Chairman rising to invite discussion. In doing so, he said that the lecture, or rather oration, to which they had just listened (and which had been delivered throughout without the aid of any note), was one which few men would be capable of delivering. He knew not which to admire most—the learning, clear diction, remarkable illustration, or admirable delivery displayed.

Mr. Sykes Ward said that there was one part of the Paper in which he differed from the reader; he believed that Mr. Tew had given far too glowing an idea of the value of the mineral wealth under Pontefract. They might geologically discover that they had sixteen or seventeen beds of coal, the one underneath the other, but they had no instance on record that it was possible to work that number; and moreover, it frequently happened that coal which might be traced continuously in a bed, was of much less commercial value in one position than in another. They ought to know something of the commercial value of the coal in its relative position before they allowed themselves to be deluded into the waste which was now going on. He feared that even within a century they would find their manufactures very much impeded and deteriorated from the destruction of our coal fields. Sometimes the getting of coal from a lower bed quite injures and destroys that in the upper bed; similarly the getting of the coal from an upper bed causes water to accumulate in such a manner, that it is afterwards impossible to work the coal in the lower bed. As Secretary of the Society, he wished to state that they would be extremely glad to receive some short Papers, giving practical details as to the most economical way of working our coal fields.

ANCIENT BATTLEFIELDS IN THE SOUTHERN PORTION OF NORTH HUMBERLAND; SHOWING HOW PONTEFRACT OBTAINED ITS PRESENT NAME. BY REV. SCOTT F. SURTEES, RECTOR OF SPROTBROUGH.

In the days when we elder ones were educated, we were taught "to live and learn;" but since then so much has been altered, the England of our youth is so changed,—its schools and school histories almost as much as its means of locomotion. Well! those of us who have profited most by what is passing around us have taken as our motto, and found its value, "live and unlearn." If this is needful in things political and social, much more so is it in researches historical and archæological; there are so many intelligent minds occupied upon these subjects, they who are seeking after truth for truth's sake, determined to follow it wherever it may lead, have such great advantages, there is such an interest generally aroused in the country upon such subjects as those we are met to discuss this day, that it is no wonder as old opinions are brought face to face with the day, and the new light—from the publications of original documents, and the different readings of ancient MSS. as collated one with another—turns its "bull's eye" of truthful earnest investigation on many a dark corner of so-called history, that the historian who has parrot-like repeated by rote what he found written afore, finds that statements which he fondly hoped would never have been investigated or looked into, are suddenly ruthlessly questioned and brought to an ordeal which he little recked of. We live in an age when shams go down fast, and when the heresies of a few years back are received as orthodox truths, and darkness which might be felt is exchanged for the full blaze of the light of the nineteenth century.

A stubborn adherence to facts, in the face of evidence, is, however, not uncommon, especially amongst archæologists. We all of us bring prejudices, more or less, out of our nurseries, and the small modicum of history which was flogged into us at school haunts and disturbs our judgment in later years. It has been well put, that there is no progression in historical inquiry without retrogression; at any rate, I myself feel that many of my earlier ideas on archæological subjects have to be recanted, and it would be a want of moral courage not honestly so to do.

I shall have to ask you this day for great indulgence. I shall have to bid you draw largely on my motto, "live and unlearn," to give up many cherished opinions—much that you have studied or read or taken for granted connected with one of the most important eras of our country's history, and shall lay before you proof, convincing, I hope, to each and all, that what I state commends itself to your intellect and reason and common sense. I am one of those who believe that this North Humberland, *i.e.*, the country North of the Humber, taking the words in the widest signification, was the cradle of Britain's greatness. I believe the Brigantes were first and greatest in prowess when Britain was first known to the civilized world; that the Romans in their might dwelt here "within the wall, on the south side of it," as Bede informs us; that it was at their chief town that emperor after emperor resided, and the main body of their legions had their home; that not far from hence was their first great colony, Camulodunum. "Brigantes fæmina duce exurere coloniam,"—Tacitus. Polydore Virgil—"Puto Cambodunum Doncaster aut Pomfrid. Ptolemy—"Southernmost amongst the Brigantes, near the Parisi, below York," "twenty minutes more northerly than York." It must have been situate amongst the Brigantes, for Tacitus tells us Claudius took "Cunobelin's royal city of Camulodunum," and Seneca

tells us that campaign was against the Brigantes. Two Roman camps yet remain in this neighbourhood, one on Sutton common, and the other on the banks of the Went opposite Castle Hill.

It was also "near Eborac liand by Humber flude," that Hengest the Jute (you may call him Sassenach, if you like: was he one? In the poem of Beowulf—see Lappenberg, vol. 1-27—Hengest is expressly said to be a Jute, who had been sent to invade Frisia by Halfdene, a Danish king: this is one thing you have to unlearn) and his followers were settled as an advanced guard against the Picts and Scots; it was here in the North that Arthur grappled with them and overcame them. True, that afterwards the Anglo-Saxons held rule for a time, but soon the Northmen evicted or enslaved them, and themselves divided and colonised and tilled the lands: not Saxon, but Scandinavian, are we. Ethelward's Chronicle—"Halfdene settled in Northumbria and portioned out the lands." Book of Hyde—"York, the inhabitants had had much intercourse with the Danes and become like them in speech." Gaimar, A.D. 870—"No Dane had rest until this country North of the Humber was conquered." It is to these Norsemen we owe our free institutions and love of liberty, it is Norse blood that flows in our veins, the Norse language that lingers in our talk!

When Tosti was ejected, the reason given was (William of Malmesbury), that they were "free born and free educated." It was here that free institutions took deep root, the gradual adoption of which have made England what it is. It was not the Wītenagēmot nominated by the King, but the meeting of the Thing-men, "udal born," which contained the germs of a people's Parliament. It was the democratic, and not the monarchical, which was the leading element. Wessex is but as of yesterday, as compared with Northumbria; and London became great amongst the Southrons only

because it was, like its sister Dublin, a colony of Norwegian or Danish lithsmen. "At first," says Professor Morley, "every man of genius seems to have been a North-countryman, and it is in Yorkshire that we find the birth-place of our literature. . . . It is the region also of invention and commercial enterprise, that made us traders with the world." In all that relates to progress, socially, commercially, politically, we yet hold our own; and in the senate and the cabinet the North country element fills no mean position. I press these points upon you—you will never read the history of your country aright, never solve many a social puzzle in legislation, unless you bear in mind that this England of ours contains different races, that centuries have not welded them into one; that if our lot is cast amongst the Southrons, it is as dwellers in a strange land, our ways are not their ways, our manners not their manners, our modes of thought not their modes of thought.

At the period I have just mentioned, when the men of the North proclaimed themselves "free born and free educated," Wessex was subject to the grinding tyranny of the Dane, and Godwinsons were paramount at Edward's court.

Well, I am about to speak of pre-Norman times, of those great events which took place in this Southern part of North Humberland, in that eventful year which succeeded the death of Edward the Confessor, and before the Conqueror had made good his footing in our land.

Before I enter upon my subject, there are some points which it is necessary to bring before you, to enable you to comprehend more fully the subject of my lecture.

Firstly. Disabuse yourself of the idea that we in the North are Saxons. The predominant race amongst us is Scandinavian: it may be either Danish or Norwegian, but the leaders and majority of settlers were either one or the other. As the Danish or Norse faction predominated, so their party

rulers held sway or were hurled from their thrones. For two centuries or more, spasmodic efforts were made, and sometimes with success, to gain for the Southerner a nominal superiority; but it never meant much more, after Halfdene's advent, than the allegiance the Viceroy of Egypt holds to the Sultan, and for practical purposes was null and void.

The Yorkshire dialect, the Yorkshire speech, the Yorkshire race, has in it little element of Saxon, much and most of Scandinavian. Professor Worsae, of Denmark, says:—"The popular speech in the North of England is especially remarkable for its correspondence with the dialects current in the Danish peninsula." . . . "The Jutland resembles the English language more nearly than other sections of the Danish language." The Rev. J. C. Atkinson, in his introduction to his *Glossary of the Cleveland Dialect* (a book which no library is complete without, and which I would earnestly recommend every North-countryman to purchase or consult), shows that out of 119 names of places in a given district investigated, 67 are indisputably of Danish origin; that 75 per cent. of the Domesday names of this Yorkshire district are certainly at least old Danish or Norse; that in Domesday the old landowners were almost exclusively Danish; that out of 27 names, only 2 are Anglo-Saxon; that out of every 100 words, only 10 per cent. are Anglo-Saxon.

Secondly. You must remember that England, however galling it may be to our national pride, had been utterly and entirely conquered by these Scandinavian Vikings, the spirit of the dwellers in the South had been hopelessly broken. The Danes had crushed them down to a miserable and abject slavery. "England has been many times conquered by foreigners, by which means it changed its citizens and population and names."—Chronicle, Wavrin.

"The Danes kept them in a very degraded position, and

often did them dishonour. If a hundred met one of them, evil arose if they did not bow themselves to him; and if they came upon a bridge, they were required to wait: it was a crime if they moved before the Dane passed. In passing, every one inclined himself, whoever did not, if he were taken, was shamefully beaten. In such vileness were the English." —Gaimar.

"It must be recollected that these strangers made the country entirely their own. Halfdene divided Northumbria amongst his followers, who tilled and sowed the lands which they had won. . . . The conquest of the Anglo-Saxons by the Danes appears to have been as complete as that which was effected at a subsequent period by the Normans."—*Rise and Progress of the English Commonwealth*, by Palgrave.

"The old Anglo-Saxon names gave place to Danish appellations."—William of Malmesbury.

Then recollect there were two parties of these conquerors in England. The Norwegians, who for the most part occupied the North, and the Danes, who, monopolising the name of both in after writings, generally speaking, were the masters of the South. At home, in Norway and Denmark, as all the Sagas witness, they had ever and always a duel going on; for a time they might lay aside their enmities, and make a joint cruise or descent upon some unguarded shore, but the normal state of these two nations was one of constant hostility. As at home, so abroad; as they fought against and devoured one another in their fatherland, so also they did in their land of adoption. You cannot read English history aright, at least that deeply interesting part which preceded the coming of William, without taking this with you as a clue whereby to unravel the twisted skein. Put out of your thoughts the enslaved and conquered English, the battle for dominion was fought out between the partisans of the Northmen and the Danes.—*War of the Gaedhill with*

the Gaill: Preface, edited by Todd. (Irish.) "Two distinct parties of Scandinavian invaders, the azure Gentiles (in old MSS. Lochlannos). The white, or fair-haired, Norwegian. The black, or dark-haired, the Danes. The two nations constantly fighting."

"The Black Lochlanns and the White Lochlanns came to help Sitric."—Gaedhill.

Also, see *The Brut y Twysogion*, A.D. 795.—"The battle between the black Gentiles and the fair Gentiles, and the black Gentiles driven out of Ireland."

"The black Pagans first came to the island of Britain."

"Tham of Norwei and the Danes Oste."—Langtoft.

"The good Norays and the false Norays."—Langtoft.

"The Duke of Normandy belonged by blood and habits to the race which had produced Regnar Lodbrok, Hingwar, and Hubba; Halfdene, Hastings, and Rollo."—St. John's Four Conquests.

Now if this be history, and if the statements of most chroniclers, as well as the testimony of local nomenclature and the indubitable evidence of a Scandinavian tongue spoken in this land North of the Humber bears it out, we shall expect to find that Scandinavian customs, common to free men, are Northumbrian also. "They had their house things, their court things, their general things, their thing men." I am quoting from *Laing's Kings of Norway.* "Sweden had its Lag thing, in each of its five different divisions, and at Upsal, the chief thing, where its king must be elected. The Ore thing, at Nidaros, in Drontheim, could alone confer the sovereignty of Norway. Cnut must go to Drontheim and call a thing before he could become king; Magnus must go to Denmark and call a thing at Viburg. "The Danes elect their king at Viburg, in South Jutland." So, similarly, each separate district had its separate place of meeting, no doubt, in Northumbria also; and one spot,

hallowed above all others by tradition and association, where, as at Scone and Tara, its chief must receive the kingdom. This very Harold, of whom we speak, says, "He must go to Viburg thing, and get himself proclaimed king of Denmark." As to local things, we have "Law-ton," or, Laughton-en-le-Morthing, in this Southern district. I believe it would much help to elucidate our history if we looked about more closely for these leading places, memorable in olden time, around which are grouped and gathered all the interest and tradition of each separate race. There are strong testimonies everywhere to this ancient custom.

We shall find as we go on how important its bearings on the subject; thus Mr. W. F. Skene, on the coronation stone, traces its history to the earliest period:—"The kings of Scotland, first of the Pictish monarchy, and afterwards of the Scottish kingdom . . . were inaugurated on this stone, which was never anywhere but at Scone, the *sedes principalis* of the Pictish and Scottish kingdom. The stone seems to have been eight centuries at Scone, before it was removed to England, 1296."

Travels in Dolomite Mountains, by J. Gilbert.—Carinthia, "at Karnberg, six miles north of Klagenfurth, its capital, is a stone block, on which the dukes of the country sat when installed. A little farther off stands the most ancient church in Carinthia, and thither, after installation, the duke repaired to hear mass, viz. the old church of Maria Saal, where the second rite of investiture was performed; and at no great distance is the Hezrogs Stuhl, where the sovereign princes seated themselves to receive the homage of their vassals, and take the oath to administer justice impartially, and there stands that coronation seat, though the race of rulers for whom it was intended is vanished. It is of the rudest construction, consisting of hard unpolished slabs. This venerable relic stands in the midst of an open common."

Pilgrimage in Old Servia, by P. Irby and Mackenzie.—"The old church still there; minster of Dēchănĭ; opposite the altar two stalls, one the bishop's, the other the old marble seat of the Serbian kings."

Baedeker's *Rhine*.—"The Donnersburg dedicated in ancient times to the god Thor, called by the Romans Mons Jovis. The upper part a tableland. The Konigs-stuhl, a porphyry rock, on which the Franconian kings and the courts of the Wormsgau are said to have held their tribunals. So also near Stolzenfels, on the Rhine, Konigs-sthul. . . . The Emperor Maximilian took the oaths when on his way to his coronation at Aix-la-Chapelle. . . . Near here, in A.D. 1400, the Rhenish electors deprived the Bohemian king Wenzel of his imperial crown. On the following day they crossed the river to the Konigstuhl, and elected the Count Palatine Rupert III. in his stead."

So at Pesth (Murray's *Handbook*) is the seat of the chief judicial tribunals of Hungary: "they are called Konig-liche Tafel, or Royal table and Septemviral Tafel, because originally of seven members. It is the supreme court of appeal in the kingdom. In the field of Rakos, the Diet, the great national assembly of the Magyars, was anciently held in the open air."

"Close to Presburg, a hill called Konigsberg, to which the king repairs after his coronation, and makes the sign of the cross with his sword."

History of Germany, by W. Menzel, p. 23.—"The thing, or dingstatt, under a great tree, ash or oak, or by enormous stones. . . . The centre of union in olden time, not a king, but a popular assembly in some sacred spot."

I have said that one of the most important eras in the history of our land was that year of sensational events which followed the death of Edward the Confessor—each party had long been waiting for this event, and the silence was like

that which precedes some great convulsion of nature. The antagonism of centuries, and the hatred of race brought by these Vikings from their Scandinavian homes, culminated in one fierce death grip, when the last of the Saxon kings, who, Norse in his sympathies, but Danish in his ministers, held the balance between the two factions, until his death left the prize for an open contest. The day of his death found Harold Godwinson king; the day of his funeral witnessed, with untimely haste, Harold's coronation. When William meditated invasion, he knew there was a large party who favoured their kindred Northerners. Himself of the same lineage as the masters of the North, he had a party ready to assist him. Wessex might hold to the side of Harold, but not Northumbria, and Mercia and London would be doubtful. Godwin and Godwinson were no Englishmen at all, they were of Danish race and Danish feeling; they had that poor weak creature, Edward the Confessor, under their iron rule, and, spite of his struggles, they kept him in their grip.

They held their position by means of their armed retainers or huscarles, and their rule was cruel and oppressive to the natives. In the North, they who had ejected Tosti, a Godwinson, "because never a Dane should reign over them,"* (Dux would be nonsense,) would be ready to take part with a king of Norway, or duke of Normandy, and that welcome, not without reason they counted on, they received.

This will account for what must otherwise seem so strange, that after the loss of one battle England lay at William's feet. When Harold's personal followers, his own bravest mercenaries or huscarles, perished at Standford Bridge, the fortunes of his race were done; "of the people there

* Bonnechose, Livre iii., c. iii.—"Se homines liberè natos, liberè educatos nullius daci ferociam pati posse, a majoribus diduisse aut libertatem aut mortem." William of Malmesbury, p. 83.—La dénomination de danois (Dacus) donnée ici a Tosti fils de Godwin et de Githa, sœur du roi de Danemark, est digne d'attention.

were few with him," knelled the doom of the Danish faction (Malmesbury).

I am now about to treat of the *so-called* battle of *Stamford* Bridge. What are the events which preceded this memorable battle? a battle, remember, on which the fate of England hinged, a battle which, according as it was lost or won, affected the position of the English nation for generations. If Harold Sigurdson, the king of Norway, had not landed, and in that hard-fought battle slain the best and bravest of Harold Godwinson's (the leader of the Danish faction in Wessex) huscarles or standing army, the event would probably have been different, when within a few days he met and fought with William at Senlac. The raw recruits he pressed into his service were not like those favourite huscarles who died in that fierce fight, or rather, three fights in one, which lasted all that day from early dawn to evening close, and found them few in number, but victorious, with Harold of Norway and Tosti, the two leaders of the Norwegian host, dead, and the main body of the foe discomfited and either flying or slain: a slaughter so great, that in after ages the bones of the unburied dead still lay in heaps upon that plain.

> Like the leaves of the forest, when summer is green,
> That host in the morning all radiant were seen;
> Like the leaves of the forest, when autumn has blown,
> That host in the evening lay scattered and strewn.

Orderic Vitalis (mark this well), A.D. 1141.—"The place of battle is easily discovered by travellers, where great heaps of the bones of the slain lie there unto this day, to bear witness of the prodigious number of both people which fell."

What were the steps which led up to this campaign? Tosti, seemingly once the favourite of Edward and his wife, had been supplanted by Harold and banished. Brother-in-

law of William, it was not unlikely he would ally himself with him against the brother who deserted, even if he did not scheme against him, in his utmost need. On Edward's death, the plan, no doubt before agreed upon between them, was carried out by Tosti. William gives him ships, he turns Viking, and harries the English coast. From thence he is said to go to Denmark, and finding no help there, is more successful with Harold Hardrada, king of Norway. He becomes "his man," promises that many of the Northumbrians will join his standard, which promises were fulfilled. An expedition, on a much larger scale than had ever before been attempted, leaves the fiords of Norway to conquer England. England was to be to Norway what it was to Denmark in the time of Cnut; two hundred ships, besides transports for provisions, in all making five hundred (Gaimar says four hundred and seventy), bear this mighty armament on its way. It would seem, from after events, that while Tosti and Harold of Norway were to land in the North, William was to act simultaneously with them in the South. The old men see visions, and the women dream dreams; but not such old wives' tales daunt Harold the Hardy!

At Orkney, he leaves wife and daughters; at Klifland (Cleveland), he plunders; Skardaborh (or Scarbro'), he pillages and burns; and to proceed, in the words of Snorro *(Laing's Translation of the Saga of the Kings of Norway)*, brought up at Hollow-ness (Holderness), "thereafter the king sailed to the Humber, and up and along the river, and then he landed. Up in Yorvick were two Jarls. King Harold lay in the Usa: a battle was fought at Fulford; the Norwegians were victorious. After the battle now told of, all the people in the nearest districts submitted to Harold, but some fled. A thing is held; the people gave him hostages, the children of the most considerable persons of the

town, 'Jarl Tosti, well acquainted with the people of that town,' and laid his army at Stafnfurdo-bryg. *The king returned down to his ships.*" Thus ends act the first.

"A thing appointed for Monday morning *early*, to settle the affairs of the kingdom. The same evening (*i.e.*, that Harold of Norway had returned to his ships) came king Harold of England, Godwinson, from the South to the castle, and rode into the city with the good will and consent of the people of *that castle*. All gates were shut, and the army remained that night in the town. On *Monday*, Harold Sigurdson ordered trumpets to sound *to go ashore*. The weather was fine and hot sunshine,—one-third left to watch the ships. As they came near *the castle*, a great army seemed coming against them. The men had come to land but half equipped. A cloud of dust reveals their presence. Tosti says, Let us turn about as fast as we can to our ships (they could not have been far off) to get our men and weapons. King Harold says, Let us send three horses and three of our briskest lads, and let them ride with all speed to come quickly to our relief. King Harold set up his Standard, the Landreyda or Land-ravager. The infantry were drawn up in a hollow circle (the Shield borh) or Shield fort, shield linked to shield, and their spears driven into the earth before them, to receive cavalry. Jarl Tosti, at another place, had a different banner. A parley takes place with him, he is offered half the kingdom for himself, and when he asks what for Harold, his ally, the answer is, "Six feet of English earth, or as much more as his length exceeds other men." "Ride back," says the indignant Tosti, "to your master, and let him arm for the fight, for never shall it become a truthful tradition amongst the Norwegians that Jarl Tosti forsook their king in the land of his enemies. The English cavalry sweep down on the Norwegians; Harold, unarmed, rides about encouraging his men, and chanting his

lays as he fights with his accustomed vigour, as the Saga describes him :—

"Where the battle-storm was ringing,
Where the arrow-cloud was singing,
Harold stood there,
Of armour bare,
His deadly sword still swinging;
The foemen feel its bite,
The Norsemen rush to fight,
Danger to share—with Harold there,
Where steel on steel was ringing."

An arrow or bolt pierces him in the neck, he falls dead. After Harold's death, Tosti has the charge of the king's Standard. Tosti, in turn, bites the dust. But Lrystein Orre, left in command of the ships, and his contingent, now arrived, "all clad in armour." "They had come so fast, they were exhausted, and hardly fit to fight, before they came to battle. They were offered quarter; they refused it. They threw off their coats of ring-mail, and many fell from weariness, and died almost without a wound. This happened towards evening; many fled, and darkness fell before the slaughter ended."

So far we have the events described in the Sagas of the kings of Norway.

Florence of Worcester, the Chronicle of—

"After this, Harold Harvagra, king of the Norwegians, and brother of St. Olaf, the king, arrived on a sudden at the mouth of the river Tyne, with a powerful fleet, consisting of more than five hundred large ships. Earl Tosti, according to previous arrangement, joined him with his fleet. They hastened their course, and entered the river Humber, and then sailing up the river Ouse, against the stream, landed at a place called Richale. King Harold, on hearing this, marched in haste towards Northumbria; but, before his arrival, the two brothers, Earls Eadwin and Morcar, at the head of a large army, fought a battle with the Norwegians on the northern bank of the river Ouse, near York, on Wednesday, being the Vigil of the feast-day of St. Matthew the apostle (20th September), and they fought so bravely at the onset that many of

the enemy were overthrown. But, after a long contest, the English were unable to withstand the attacks of the Norwegians, and fled with great loss; and more were drowned in the river than slain in the field. The Norwegians remained masters of the field, and having taken one hundred and fifty hostages from York, and leaving there one hundred and fifty of their own men as hostages, *they went to their ships.* Five days afterwards, that is, on Monday, the 7th of the kalends of October (25th September), as Harold, king of the English, *was coming to York*, with many thousand well-armed fighting men, he fell in with the Norwegians at a place called Stamford-bridge, slew King Harold and Earl Tosti, with the greater part of their army, and gained a complete victory; nevertheless the battle was stoutly contested."

What, then, do we learn from these accounts? Florence of Worcester tells us that the place the Norwegians landed at on the Ouse was "Richale."

Simeon of Durham does the same—"Up the river Ouse, at a place called Richale." Peter Langtoft, a Yorkshireman himself, gives us more exact information—"En le braz de Ouse suth Rychale;" "in an arme of Ouse suth Ricall lai." Roger of Hovenden (or Howden, in the immediate neighbourhood), says, "They take and leave also from York one hundred and fifty hostages, and *return to their ships.*" Geoffrey Gaimar fixes the locality more closely—"From the Humber they went to the Ouse, and disembarked at St. Wilfrid's" (Petrie notes this as Brayton, where is St. Wilfrid's church, and gives the number of their ships as four hundred and seventy). The "Kronicle Danmarkts Kigis," printed A.D. 1652, says, "It sted heeder Ricale." This Danish Kronicle also states that they took one hundred and fifty hostages from York and "drog saa til Stibs igien." It also agrees with the English, that it was five days after, that as Harold Godwinson was coming "til Eboract" ("til" *towards* York) he fought with Harold of Norway and Tosti, at "Strand for brygge."

The Saxon Chronicle,—indeed all authorities,—unite in

stating distinctly and positively that they, the Norwegians, "*went back to their ships.*" Now the place of battle is seldom, save by modern authors, I believe, called Stamford bridge. The Saxon Chronicle, which gives different accounts in different MSS. of the battle, says, "aet Steinford brygge," "Staengfordes bryege." Peter of Langtoft—Staynford and Staunford. William of Malmesbury—Standford Brigge and Stant-ford bridge. Thierry says, "Sortit du camp sur l' Humber." Pere d' Orleans (Paris, 1737)—"Their camp was where their ships were at anchor, with their left on the Humber." Roger of Howden—"Standford bridge." Peter Langtoft says, "They have one hundred and fifty hostages from York in their power. News come that Harold, son of Godwyn, is coming to destroy them. The Norwegians pass thro' the meadows to Staunford brige—Staynford brigge—and all take lodging there; king Harold came upon them, his standard displayed." "They fight from *morning* until evening. King Harold and Tosti slain. In the morning it was he mette with his enemys, all the day they fought, at even he had the pris." Chronicon Manniæ—Steinford brige. Now we have arrived at this point for certain: that the Norwegians went back to their ships; that their camp was situate on the Ouse, near the Humber, "South Ricall," at St. Wilfrid's, and that the battle has the name of Stand-ford Bridge or Staynford, but seldom that of Stamford. Five hundred ships would, when at anchor, from below Ricall reach at least to Selby. Next we have an account of Harold Godwinson; he, it appears, marched his army in seven divisions, and then "on Sunnandœg; Harold, king of the Angles, arrived at *Tada*"—(Saxon Chronicle). We have learnt from the Saga, that this was the same evening that Harold Sigurdson and the Norwegians left, "went *to their ships*, and agreed to full peace, so that they should all go with him south and this land subdue." We have also

learnt from the Saga that there was a thing appointed for *Monday morning early*, and that Harold Sigurdson did disembark *from his ships* to go to this thing—"there, from all the shire, hostages would be brought to meet them." "Early in the morning," the battle did begin: Henry of Huntingdon and Peter Langtoft tell us this. Brut-y-Twysogion—"Harold, unarmed and unawares, surprised by Heralt Jarl, son of Gotwin Jarl, and by sudden attack, aided by national treachery, slew." (Saxon Chronicle—"unawares *beyond the bridge.*") It must, then, have been some place near "Tada," and *within reach of the Ouse, "South Ricall."* But where was Tada?* Why, we know from Domesday it was this very place where we now are met. Kirkebi, Danish, and Tateshalle, Saxon, names for Pontefract. (A recent writer adds "ceastre" to the Tada of the Saxon Chronicle, and manipulates it to suit his purposes into Tadcaster!) Strange, that since this was written "the Surtees Society" has edited the works of Simeon of Durham, and there it is stated that when the chief men of Northumbria swore allegiance to Edred, A.D. 949, they came to Taddenesclyf (Florence of Worcester, and Saxon Chronicle); and, most satisfactory to me, I find this singular note. There is in the margin of the MS.: "Taddenesclyf erat tunc villa regia quœ nunc vocatur Puntfrait Romane, Anglice vero, Kirkebi." Ness is, as you are all aware, a promontory, it may be of any sort, either on the human face, or a headland in shore or at sea. There are "nesses" near here, and everywhere in the north: at Cawood Cawood ness, at Drax New Haagness, the nesses at Ricall, &c. Saga—"Guthron, in answer to king Olaf: I would have the whole ness that goes out into the lake sown with corn; on that ness there are ten farms." Here, then, is Tada-ness-cliff.

* Tada, or Tate, was another name of Ethelburga, wife to Edwin; and it was near a villa regia, in Northumbria, where a Witenagemot was being held, that the events occurred which made him a convert to Christianity.

It was here, on that cliff, as they came near that castle (Kastel, Danish), that they encountered Harold Godwinson. Here, throughout the lofty cliffs, above and along the banks of the Went, are rocks scarped and entrenchments everywhere to be found; a position, the first rising ground and strongest, as you sail up "Humber flude"; and here, as Laughton-en-le-Morthing in Northumbria, and Upsal in Sweden, a thing mound, flattened at the top. It was thither they were going to renew the kingdom, and, as at Upsal, Nidaros, Viburg, and all the other places I have fore-mentioned, Harold, like Edred, must there receive the kingdom. The next stage in the eventful proceedings of that remarkable day, is the battle itself. I have the greatest faith in local nomenclature; and here, just within sight of Tada, within reach of Ricall, St. Wilfrid's, Greave-field, Standing-bridge, Castle-hill, King's-Land-wood, we find KING'S STANDARD-HILL, KING'S STANDARD-WOOD: it was here, surely, that king Harold Sigurdson's Standard was set up, and the "Land-ravager," or "Devastator of the Earth" was unfurled, for the last time victorious. It was here that Harold Hardrada fondly hoped he could hold his own until his reinforcements from his ships near Ricall should arrive. From early morn, all day long, the wave of battle surged and broke around that Standard Hill, and it was not until the sun was westward in the horizon that the little remnant of that gallant host turned their backs upon that field where, with Harold the Hardy, the hero of a hundred fights, and Tosti his companion alike in arms and prowess disdaining to purchase a kingdom and safety at the cost of life and honour, lay the best born and bravest of the Norwegian people, in huge hecatombs, dying and wounded and dead! There, where memory and tradition and local nomenclature have ever called the spot by the old Danish-spelt name of Greave. "Grove" is but of yesterday; in the tithe or inclosure map of

1799 A.D., in the custody of your courteous postmaster, you will find the district and every place and all connected with it, time after time called Greave field, Greave, Greave lane; and in a map, many years of older date, done for the Marquis of Rockingham, with the ancient roads and names of this part of Yorkshire, in the possession of Earl Fitzwilliam, I find the same testimony—the same spelling of the Norse-word Greave. "This happened toward evening, and the darkness fell before the slaughter ended," is the simple, but pathetic statement of the author of the Norwegian Saga. But why was that triumph so long delayed? William of Malmesbury—"However reluctantly posterity may believe it, a single Norwegian for a long time delayed the triumph of so many and great men; for, standing on the entrance of a bridge called Standford Brigge, after having killed several of our party, he prevented the whole from passing over. He reproached them as cowards, and, finally, while vapouring about was transfixed by an iron javelin." The army immediately passed over without opposition, and destroyed the "*dispersed and flying Norwegians.*" Now mark: when the bridge was forced they came upon the "dispersed and flying Norwegians." This shows that Harold Godwinson's forces were in two divisions, and that one had already dispersed the Norwegians on the other side of the river. This entirely overturns the fiction that the Norwegians were this side of the river between York and Stamford Bridge. To this agree the several accounts from the different MSS. of the Saxon chronicle—"The English hotly slew them from behind until they came to their ships." Another account, whilst stating that Harold had come upon the Norwegians "unawares from beyond the bridge, and that they were fighting boldly long in the day, and that the Northmen fled," goes on to give the story of "one of the Norwegians who withstood the English folk, so that they *could not pass over the bridge to obtain the victory.*"

Henry of Huntingdon, who gives many minute particulars which others do not, says "the armies were engaged from daybreak to noonday." He also states that "the Norwegian who took post on a bridge killed forty of the English with a battle-axe, and *stayed* the advance of the whole English army until the ninth hour." Harold Godwinson then had clearly made a detour, "qui avait marche de maniere à eviter les postes enemis," as Thierry puts it; he had most probably pushed on with his cavalry, whilst his main body came on by Watling Street to Tada; it is evident he was on the other side the bridge, as when *the whole army* had forced a passage they fell upon the "dispersed and flying Norwegians," and made the defeat a rout. In those days, armies when they marched must have followed the main track ways. We have an account of the highway from Pontefract to York, such as it was, in Orderic Vitalis: "When William passed Pontefract the road now lay through forests and moors, and over hills, and along valleys, by paths so narrow that his soldiers could not march two abreast; in this way they at last reached the neighbourhood of York:" and yet it is over roads of *this* sort that our writers of philosophic history would fable them to march 18 or 20 miles, from Tadcaster to Stamford Bridge, and arrive "in the early morning;" or, *vice versa,* Harold of Norway to send for reinforcements from his ships, which, spite of the dreadful heat of that day, come up in time from "Suth Ricall" to take part in the contest! It is just simply an impossibility, it could hardly and with difficulty be done from Brayton to King's Standard Hill.

If, then, the Standford Bridge could not have been the other side of York, where then is this bridge to be looked for? Why, here—"Standing Bridge,"—near "Standing Flat," where the "Roman Rig" crosses the river Went. Note the curve it makes to take in the bridge, leaving the

ford to your right hand. "Stand, or Staae,"—to stop, to stay, to put a stop to (Danish dictionary); Atkinson's Cleveland dialect—"Stand,—to be stopped, not to be going, of a clock."

I do earnestly press upon my hearers that in this North of ours it is the Scandinavian, and not the Saxon, which is the ground-work of our language. What a wonderful incidental witness is borne to this fact by one of the after-events of this battle! Strykar, fleeing from the fight without his armour, meets with a Northumbrian peasant, and asks him to sell his sheepskin coat. "I know thee by thy tongue," says the peasant; "thou art a Norseman, I would I had a sword to slay thee." "But I have one," rejoins Strykar; cuts off his head, and takes his coat. Here is clear evidence that the Norwegian and the Northumbrian peasant understood one another, and that their folk-talk was only diverse in its Shibboleth.*

Only recently, in a Yorkshire paper, I read an account of a man telling another to come down from the "stee"—ladder; and those middle-aged gentlemen amongst you who declare that driving grouse is such first-rate sport, hear your keepers talking to you in Danish of "ligging pits." Your streets and roads are called "gates;" your fords, "wath or vade;" your Roman way, "Roman-rig;" your meadows, "ings;" your low lands, liable to floods, "flad or flats;" your election saturnalia, "hustings or hus-things;" in a bad temper you send your opponents to Old Nick, "Nokte;" your Christmas festival is "yule;" your very division of your county into ridings is a division of country still known in Norway.

One more evidence and I have done. Whenever I am in

* Mr. Atkinson, writing to me, says that Professor Worsae seems to consider that the termination "bi" or "by" is Danish, as opposed to Norwegian "bo" or "boer;" as also that "thorpe" is Danish, "thwaite" Norse.

doubt upon any point regarding the history of our country, I turn to foreign writers to find what they say upon the subject. As at Brussels, I found a history there which told me that the camp of the Norwegians was near the Humber; so, in Paris, I found a history which told me the locality of Standford Bridge. An English transcriber one or two hundred years after the event, would, if he found anything to militate against the received opinion of his day, most probably alter the text; the foreign historian, with no semi-local knowledge, would copy his MS. faithfully. There, in this old history of Normandie, picked up haphazard with the hope I might find some point bearing upon my subject, I note the following (evidently, from the type, an extract) copied from other and more ancient chronicle; and what do I find, but a corroboration which must carry conviction to every one unprejudiced that I am right? Speaking of this battle and the death of Harold Hardrada and Tosti, "*Les chroniques font mention d' un vaillant Norwegian qui defendit un pont, en un village nomme Pontfract lequel á lui seul empecha long temp les Anglais de passer. Cette dervute des Norvegiens eut lieu le* 25 *Septembre,* 1066, *pres de la riviere d'ervente.*" (Histoire de Normandie. Versailles, J. P. Jalabert.)

Is it possible that I could have invented this, that I could by any sleight of hand have foisted what suited my purpose into a book published before I was born? from whatever work that author extracted that sentence, it must have been from a written tradition of generations past. I had accumulated proof sufficient without this: it caps the capital.

May we not also find in the French chronicler a clue to the mistake? "Cette deroute eut lieu pres de la riviere d'ervente."

It is d' (apostrophe) ervente: may it not have been written thus—"De went," and as the river Went was not navigable, and, therefore, comparatively speaking, unknown, got con-

fused by transcribers with the larger Derwent, near which they had pitched their camp? It is but a slight alteration, not near so great or important as the extraordinary mistake which one writer has followed another in regard to this very battle. I cannot account for it, but it shows how easily a mistake once made is copied, one and all writing Harold "*Harfager*, or fair-haired," who had died a century before in his bed, for Harold "*Hardrada*," who met his doom in this battlefield in the Southern part of North Humberland! Then we have in our favour that soon after the conquest "Tateshalle" disappears, and in De Lacy Chartas the "village and honour of Pontefract" assumes its place. Why, and how, and wherefore this change of name in this important district? Does it not point to some important incident in connection with some broken bridge—Ponte-fract? You may see such a causeway as we may conjecture this may have been at Smeaton, a little lower on the Went; a ford below, and a raised causeway of stone with a couple of planks alongside for foot passengers. "Liable to floods" is written down still on the low lands round Standing Bridge; the valley of the Went and the whole of this district in old days, when the outlets of the Ouse and Humber were water-logged, presented a very different aspect to what now it does.

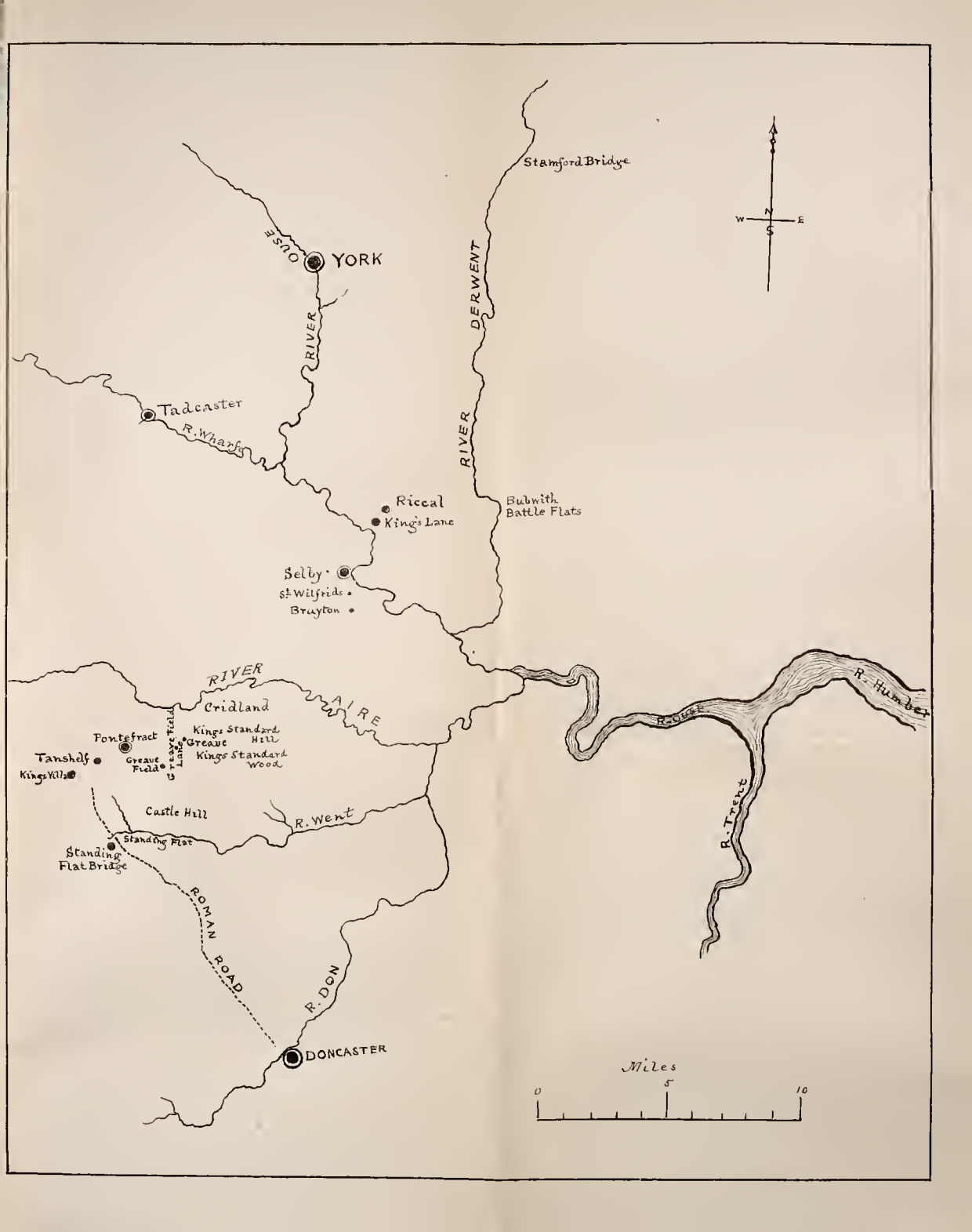
Lastly, what light does topography and a view of the country and the traditions of the past throw upon our subject? Stamford Bridge! no one can view the false or "Brummagen" spot without a conviction coming across him—Not here could Harold possibly have been taken "unawares," as we look at the dead level towards York; that not here could he, coming *to* York, at the same time have been surprised at the *other* side the river, "beyond the bridge." That it is simply impossible, as the writer of the romance in the *Quarterly* (October, 1868), on Yorkshire, would feign, that the bridge being carried they came upon the "*dispersed and*

flying Norwegians." Ask the natives there of a battle; one and all will give you for an answer, "Story, God bless you! we have none to tell, sir." The only glimmer of tradition that we can meet with is "Battle flats"; but then, alas! *bataille* is French, and could not be the language of the Northumbrian peasant of *that* day; and, if it is good for anything, there is a "Battle flat" near the Derwent, not far from Ricall, which it is within the reach of possibility might have been the scene of the conflict. It is true Kirkby's *Inquest*, two hundred years afterwards, does speak of "pons-Belli," but the natives never would and never did own the word, and it was never foisted into the nomenclature of their home. True, the writers in the *Quarterly* and Freeman's Norman History (370, vol. iii.) tell us that on the feast day in that secluded village the inhabitants make pies of pears in the shape of a boat or tub, in remembrance, not of Harold's *ships*, but of a man who got into a boat and went under the bridge and killed the Norwegian who defended it! Might not these writers, as they made their Yorkshireman talk French in one case, have fabled him to have done so in another, and have explained that pear was only broad Yorkshire for "pierre," and that it was in memory of "pierre," a stone in connection with a stone ford at the bridge, and the hot fight there, that these "pear boat pies" were on the feast day made "all hot"? Why did they not tell us that as Harold came to that out-of-the-way place in order that he might enjoy the "sentiment" of sleeping in the old (auld!) homes of Saxon kings (vol. iii., p. 355), that it was possible that "Aldby" commemorated the resting of the ark, and that it was from a recipe of that scantily-clothed dame, whom children in their play call Mrs. Noah, that the pies were made in a "boat-like" form! Why, *if* "pears" have anything to do with it, again we cap the writer of the article on Yorkshire with "Pear Tree Close" adjoining

Standing Bridge! It is strange how Mr. Freeman in his history has been mis-led by the writer of this article, and blindly followed him in his errors. How the Yorkshireman must have chuckled and put his tongue in his cheek as he told the seekers after traditions the story of the pears and the pies!

How different where tradition has a foundation in fact! I go to Ricall, I find King's-lane; I go to search the neighbourhood of Pontefract, and at once on asking about a battle at Cridland, person after person is forward to explain, "Do I mean King's Standard, or Standard Hill?" (Krid is Danish for chalk: is this the old Calcaria?) I ask if there are any barrows or places where bones have been found? a man comes forward to tell me that in the clefts of a quarry near Grove (or Greave) he had, when chalk-burning, come upon lots of bones in the fissures of the rock. I drive off to the quarry, and the wife of another quarryman tells me her husband had often found them and brought them unto her to show them—(I dare say she said, "T'meester is not in hoose," as you are startled to hear in Norway, "Is t'meester in huusen?"). I go to Stapleton to look for earthworks, and find them everywhere. I am directed to Castle Hill, and there I found a mound and series of excavations around, answering in every way to the description of the Thing mound—Laing's Preface, p. 88, vol. i. "Upsal Tings hogen or Tings mound, flattened at the top; circumference at base, 350 paces; ascent, 70 steps; height, about 90 feet." May not Knottingley be the meadows or "leys" of the Nord-thing, through the which *(the meadows)* Peter Langtoft tells us Harold Hardrada and his followers were marching to the thing which had been agreed upon, on that day, when by the treachery of those who had promised to meet him in peaceful guise and give hostages as proof of faith, he was surprised "unarmed and unawares"?

I should have liked to recapitulate more fully, and to recall to you some of the leading points which show that unless it was during the days of seven-leagued boots or the later ones of express trains, no army could have gone from *Tada*, be it where it may, *to Stamford Bridge, near York*, to fight "early in the morning," or sent messengers from thence to call up reinforcements from ships at the camp below Ricall! The distance, in both instances, is at once fatal to the theory. But there is one point which, indirectly, bears strongly in my favour—it is that the latest and most prolix of the historians of England has just published a volume of English history bearing upon this era and this battle; that in that volume of 768 pages, a large portion of it being a closely-written appendix in connection with the subject of this battle, after more than one view of the battle-ground, the author can make nothing satisfactory of it, and is driven to the strangest inconsistencies and evasions, in order to account for what must be unaccountable, and is led to a harsh conclusion, foreign to the gentle nature of one who would not tread upon a worm or hurt the feelings of a fox, viz., that all authorities, ancient and modern, are wrong, and that he alone is right! "The accounts in Lappenburgh, Thierry, and St. John, seem to have been written without any knowledge of the ground;" and, as to the Saga of Harold Hardrada, "I gradually came to the conclusion that that part of the Saga was mythical. . . . The Saga maker had to draw largely on his imagination"! and yet there were ballads extant which Snorro quotes with Harold's very words on this very battlefield, and Strykar at least escaped to tell his tale. In short, the whole of that laboured appendix on the details of the battle of Stamford Bridge is written to show that every one else but the writer of the history of the Norman Conquest (Freeman, vol. iii., pp. 352, 354, 357, 721) does not understand or comprehend the subject he is treating!


Stamford Bridge
N
W
E
S
OUSE
YORK
RIVER
DERWENT
RIVER
Tadcaster
R. Wharfe
Riccal
King's Lane
Bubwith
Battle Flats
Selby
St. Wilfrids
Brayton
RIVER
AIRE
Cridland
Pontefract
Greave Field Lane
Kings Standard
Greave
Kings Standard Hill
Tanshelf
Greave Field
Kings Standard Wood
Kings Villa
Castle Hill
R. Went
Standing Flat
Standing Flat Bridge
ROMAN ROAD
R. DON
DONCASTER
R. Ouse
R. Humber
R. Trent
Miles
0
5
10

I have kept back this Paper for some time. I am glad it is so, as I have first read it where local knowledge can supply the severest criticism. It has always seemed so strange to me that the change of name of Pontefract could never be accounted for.* The associations of the place have ever had a fascination for the historian, and, if I am right, not without reason. If, further north, Scone was ever the place where Picts and Scots and their successors in turn were crowned, so here, it may be, did each successive sovereign, tyrant, or usurper renew the kingdom.

Not far from here, at least, was Camulodunum; here, it may be, was Tate's Villa Regia; and here Edred and Harold reckoned on receiving the allegiance of the dwellers in Northumbria. Hither, in post-Norman times, came Lancaster to strike a blow for the people's rights; up yon hill he was followed and hounded to his death by the roughs of Pontefract, though in after years they changed their note and considered him as a saint.

I will just ask you to follow my ruler as I point to the places which local nomenclature identifies *(see map)*:—Ricall, King's Rudding Lane, Dane's Hills, Brayton St. Wilfrid's, Bubwith Battle Flat, Cridland (Krid, Danish for chalk), King's Standard Wood, King's Standard Hill, King's Land Wood, Castle Hill, Standing Flat Bridge, Standing Flat, Greave Field, Greave Wood, Greave, Roman road or Roman rig, crossing the Went (mark how it makes a bend towards the bridge, showing how the old Watling Street crossed the ford); "King's Villa" (not a bad translation of Villa Regia), and, finally, Pontefract, still bearing the name which tells of that desperate fight and fearful slaughter which was so long delayed by the nameless Norwegian, who slew one after another of those who tried to cross that broken bridge: an

* P. lxxxii, Domesday Book, Tateshalle. Sal or Saal, chief residence, as Kursaal=Hal or Hall.

event so memorable that it is the main point that our English historians dwell on. It was within sight of that "Greave"-yard where the bones whitened years after, as Orderic tells us, that Ilbert de Lacy reared his castle, and as travellers passed along that old highway over the ford, alongside that broken bridge, they shuddered as they saw in heaps the bones of those who died that day (Orderic Vitalis.) That castle that kept ward over that plain and bridge was not unlikely to obtain that name; still more so if, as is far from improbable, the De Lacys were of northern lineage, and could boast at least that on that day of death the Norsemen, not taken at a disadvantage, could and did hold their own.

Tedious I may have been, but interest—and that deep—I feel I have excited. It has been difficult to compress the numerous details of such a battle, and to work into a popular form, a Paper suited for such a meeting. The pains I have had to take, the authors I have had to consult, histories—ancient and modern, English and foreign—I have had to wade through and make extracts from, have been legion. No one but they who have tried it can tell what labour and thought it takes to re-write a page of history. I prove a negative, at any rate, by the impossibility of the distances of either Ricall or Tadcaster suiting in *any way* the fabled battle of *Stamford Bridge*, beyond York; and I strengthen my case by refusing to fall in with the historian of the Norman Conquest in his quiet statement that all authorities of any weight are in this particular instance to be overlooked, and treated as "mythical," because, if he is right, they must be wrong! I say that sort of writing may do for a periodical, but is unworthy of serious history. I, on the other hand, am accustomed to treat authorities with reverence and respect, and to ask myself whether it may not be that they are more likely to be right than myself, and to seek for a solution of the difficulty, not by stating their story is "mythical," but

by tracking out and believing what they say. I think I have, to-day at least, proved my point beyond all dispute, by evidence of every kind that could be brought to bear upon the subject. Each account we look into dovetails easily, and of course into its proper place: history—ancient and modern, nomenclature and topography, tradition and measurements of distance, French authors and Danish chronicle writers, the Sagas of the Norsemen, taken in their literal and honest meaning; and, not least, the *utter bewilderment* of those who take the contrary view. One and all lead to but one conclusion. — (*Freeman's Norman Conquest*, vol. iii., p. 354, note; 720, 723, 724.)

If I have "the audacity," or, as I call it, the manliness, to broach a new heresy, I am ever ready to back it up and do battle to the death for what I believe to be truth—not romance, but history; and trust that what was said of me by one of my reviewers, in sarcasm, you who know the localities will allow not to be far from true in fact, "that there is nothing Mr. Surtees has a mind to prove that he cannot find arguments to support."

ON THE STONE AVENUES OF CARNAC, AND OTHER PRE-HISTORIC MONUMENTS OF BRITTANY. BY REV. W. C. LUKIS, M.A., F.S.A, HON. MEMBER OF THE SOCIETE POLYMATHIQUE DU MORBIHAN, AND OF THE SOCIETE ARCHEOLOGIQUE DE NANTES, LOIRE INFERIEURE.

The monuments described in this article belong to that section of the pre-historic age which has been designated the period of polished stone implements. Formerly they were supposed to be among the most ancient structures that told of the earliest inhabitants of this globe. But archæological researches have now shown that there was a more remote period of human history, in which man did not erect such

buildings, but took refuge in dens and caves of the earth, making them his abodes in life and his last resting-places in death. The cave-men, however, would seem to have been more advanced in the arts than those who planned and executed the grand avenues and other megalithic monuments of Brittany. The caves which they occupied have produced engravings and sculptures on stones, ivory, and reindeer bones, that are marvellous for accuracy of delineation and truthfulness of form, compared with which the carved stones of Brittany are rude and unmeaning. Some of these sculptures and engravings, preserved in public and private collections, are full of artistic life and vigour. Now it is said that there was a remoter period still of human existence, in which man simply chipped flints into rude implements and knew not how to polish them, nor did he know how to manufacture clay vessels and to procure fire. The antiquity of this people is supposed to be lost in the impenetrable mists of the post-glacial period.

Not for the archæologist alone, but for every sensible and intelligent person, these questions have a bright, an interesting, and instructive aspect. For although the ravages of time have greatly marred these venerable relics of antiquity, still we are able to recognize in them the arts of primitive peoples, and to call up before the mind's eye the very peoples themselves; to study their mental development, and to divine the uses many of their works were destined to serve. We are able in this manner to catch a glimpse of the private life, and even the religious ideas, of peoples of whose great antiquity we know absolutely nothing at present, because written history and tradition have not reached it.

There are few countries so rich in stone monuments of pre-historic times as that portion of Western France which was formerly known by the ancient name of Armorica, and now bears the name of Brittany. These monuments

are found in every part of it, but are more numerous on the lands bordering on the sea, where the exposed shores, poor soil, and dreary heaths, have not invited agricultural operations. In certain districts they are very remarkable, and in none more so than in the Department of the Morbihan, which is situated in the south of the Province between the Departments of Finistere and Ille et Vilaine. Here we find communes in which they exist at short intervals, in every variety of form, and of all dimensions, from the rude unhewn menhir or granite pillar, standing singly, to the wonderful groups of menhirs, arranged in lines or in circles; and from the simple rectangular cist of moderate proportions, to the huge and complicated sepulchre with its side chambers and ponderous capstones.

The menhirs, or pillars, are mysterious monuments, whose destination still remains, more or less, a problem. Some are supposed to have been erected as memorials of departed heroes; others as symbols of divinities; while others have been, perhaps, mere boundary stones; but no one has yet been able to suggest a reasonable and satisfactory theory for the vast avenues or lines of menhirs, which are more numerous, more remarkable, and more visited, in the Morbihan, than in other Departments of the Province.

Most persons have heard and read of the celebrated Lines of Carnac, but few, even of those who have visited them, have a clear notion of their plan. The prevailing idea is, that all these lines of granite pillars constitute one monument; whereas they form several groups of lines or avenues, separated and wholly distinct from one another. The number of lines in the several groups vary, and each group is separated by a void space of ground. Each group, therefore, constitutes a distinct monument.

I will now describe them, and then say what opinions have been put forth as to their destination.

Near the small town of Carnac, there is an eminence, partly natural, and partly artificial, which forms a huge long barrow. On the platform of its truncated summit stands a chapel, dedicated to St. Michael, and from this elevation an extensive view is obtained. Looking northwards you see vast heaths covering a slightly undulating country, fir plantations, and, here and there, small villages nestling among elm-trees. Turning to the west you catch a glimpse of the peninsula of Quiberon, celebrated for the ill-fated expedition of the emigrant royalists in 1795, which terminated in the atrocious murder of the prisoners. To the south are the blue waves of the Atlantic, with the islands of Belle-Ile, Houat, and Haedic resting on the horizon; and eastwards the eye travels across the peninsula of Locmariaker, rich in stone monuments of gigantic size, and perceives the great tumuli of Mané-er-H'roek, the Tumiac, and of the island of Gavr' Inis in the enclosed little sea or Morbihan.

Not far from the base of the north slope of the tumulus which now bears the name of Mount St. Michael, stand two of the three groups of lines which I propose to describe, stretching from left to right across the landscape,—the great army of stones, "silent witnesses of thousands of extinct generations," regarding which neither tradition nor history has preserved the slightest record. Although composed of hard granite, many of these stones have been gnawed by time, and too successfully assailed by the strong and destructive hand of man.

If you descend into the plain, and bend your steps to the village of Menec, which lies on the left hand, you find that several of the farm-houses and cottages, with their thrashing yards and gardens, are enclosed in a circle of upright stones, which is 277 feet in its largest diameter. This circle forms the western termination of a group of eleven lines of menhirs or pillars; and if you walk eastwards you at length arrive

at the other end of the group, at a distance of 3,076 feet from the village of Menec. In the course of your march, two or three facts present themselves to your notice. You perceive that the bulk and height of the menhirs diminish gradually (*i.e.*, from about nine feet down to three feet), and that the widths of the avenues also diminish; and that as you gain the further extremity of the lines the stones increase somewhat in dimensions, not, however, rivalling in grandeur those near the circle which you have left behind you. You notice another fact, that the eastern extremity, which may be said to be the commencement of the avenues, is on a comparatively low level, that the ground gradually rises westwards over an undulating country, and that the heads of the lines and the circle are on a more elevated plateau. These are features generally noticeable in the other groups of avenues.

Continuing your course eastwards, you traverse a space of 1,669 feet, and ascend to a plateau, on which you find the western extremity of another group of avenues, consisting of ten lines, commonly known as the menhirs of Kermario, taking their name from a farm-house close by. These stones form the termination of a grand series of greater length than the one you have just quitted. The blocks of granite are of colossal proportions (about twelve feet in height), but there is no terminating circle now existing. If you follow these lines, you cross a hill by a windmill, descend into a small dell, through which a slender rill trickles, and then ascend another hill, on the slope of which the avenues lose themselves at a distance of about 4,000 feet from the other extremity. Here the stones are generally of small dimensions, few exceeding three feet in height. As you emerge from a fir plantation, which clothes the eastern slope of this hill, you perceive, on the other side of a small valley and crowning the summit of the opposite hill, the standing stones

of a third group of avenues, bearing the name of Kerlescant. A portion of the terminating circle (about 300 feet in diameter) exists here, as at Menec, and the lines are thirteen in number, and extend for 925 feet; a very short distance as compared with the other two groups, but they are supposed to have extended to a greater distance in ancient times. In tracing these three groups, you have walked about two miles and a quarter.

There are other groups of menhirs, forming lines and avenues, in the parish of Carnac, as well as in some of the adjoining parishes, as, *e.g.*, at Crucuny, Plouharnel, Erdeven, Plouhinec, and Quiberon, all of which differ in the number of their lines, and in other particulars; and of these by far the most extensive may be seen at Erdeven, where the lines, ten in number, extend for about 7,000 feet. They are generally less known and frequented than those I have described.

From the description given above, the following may be taken as the general features of these great monuments:—

The lines do not lie strictly east and west, but vary a little to the north and south of these points.

Their commencement, which is the narrow end, is invariably eastward; and the head, or wide part, is towards the west, and on elevated ground.

The stones are always largest at the western termination, and of small size in the other direction. In the Menec and Erdeven groups, however, the stones slightly increase in size towards the commencement.

Where there are circles connected with the lines, they are always at the large end.

The circles are composed of stones differing in form from those of the lines. They are thin and wide, and not so tall as the tallest of the lines, averaging about five feet above ground.

The stones of the circles nearly touch each other, whereas those of the lines have spaces of from seven to twenty feet between them.

The average distance beween the lines at the west end is thirty feet; at the east end, eighteen feet.

It appears probable that the number of the lines in each series was determined at first, and the whole number begun at once. The size of the stones indicates this.

We may presume that they were begun at the west end, and probably in all cases the circles were added last, at least after the wider or west portion of the series had been erected, because at St. Pierre, Quiberon, the circle is seventy-seven yards on the south side of the lines; at Menec the centre of the circle is south of the direction of the central avenue; and at Kerlescant it is a large segment, and not a complete circle. In no case is there, strictly speaking, an attachment of the circle to the lines.

Now just as the same facts often produce opposite impressions on different minds, so is it with regard to these monuments. Archæologists and travellers appear to have viewed them through different coloured glasses, and have drawn strange and opposite conclusions from what they have seen. It is very difficult to banish from the mind pre-conceived and favourite ideas, and the glasses they have used have thrown such an agreeable colouring around the objects, that the opinions are adhered to in spite of their fancifulness and palpable falseness.

The peasant population, for many generations, have been looking at these lines through a highly-coloured glass; and if you ask them how these stones came to be thus arranged, they will tell you without hesitation, and expect you to believe, that these ponderous masses are the Pope's soldiers. They say that St. Cornely, Pope, and now patron saint of the parish church of Carnac, chased by an army of pagans, fled

pursued to the sea-shore. Finding no boat or means of escape, and on the point of being captured, he exercised his saintly power, and converted into granite pillars the soldiers who thought to seize him.

However absurd this idea may seem to us, it is quite equalled by that of a French engineer officer (Mons. de la Sauvagere) of the last century, who imagined that the Romans erected these lines for the purpose of protecting their tents from the fury of the tempest.

The hypothesis of our countryman who saw here a temple in the form of an enormous serpent, is not more satisfactory. Nor are the other opinions admissible which would make these stones memorials of the defeat of the Veneti by Cæsar; or a cemetery of the same people after a battle; or an enormous astronomical calendar; or a military trophy in honour of Hercules; or a grove of sacred oaks, and these great stones placed in lines like rows of trees.

My friend Canon Jackson suggests that a key, that may fit this "very rusty old lock" which so many have vainly essayed to open, may possibly be found in the account of the ancient chronicler, Geoffrey of Monmouth. According to Geoffrey, in the year of Our Lord 381 a large body of British soldiers passed over to Armorica under the command of Clemens Maximus, for the purpose of attacking and dethroning the Emperor Gratian. On the defeat of the emperor, Maximus resolved to establish his army as a colony in Brittany, instead of sending them back to England. Wishing to avoid all mixture with the Gauls, he sent over to England for wives for his soldiers and emigrants. Ursula, daughter of the prince of Cornwall, and eleven thousand ladies of the higher class, to say nothing of a much larger number of others of a lower class, embarked for Brittany. Contrary and stormy winds dispersed the fleet, most of the ships foundered, and nearly all the ladies perished (See *Notes and Queries* for July, 1869).

This story, whether true or not, is presented to archæologists, that they may manufacture it, if they can, into a key to Carnac. "Upon reading this event in the old British history," writes my learned friend, "and happening to recollect, first, the situation of Carnac, upon the very sea-coast of Armorica, and, next, the peculiar number of *eleven* rows of monumental stones, it struck me that the whole number of stones having been estimated by unprejudiced travellers to have been probably ten or twelve thousand, the original arrangement may have been designed to be a thousand in each row, making in all eleven thousand. The whole might thus be intended to be a great national memorial of the tragic end of the eleven thousand British ladies."

Unhappily for this ingenious theory, this key does not fit the rusty old lock at all. It is presumed that the Carnac lines are composed of eleven rows, but as I have shown that they are in reality *three* distinct monuments, one having eleven, another ten, and the third thirteen rows of stones, and that, besides these, there are five or six other monuments of a like nature, not one of which has eleven rows, I do not think the foundation a very good one whereon to erect such a theory.

There is no doubt that the number eleven has been assigned to these lines by careless observation, and once stated has been accepted unchallenged by succeeding writers. In the same way the three groups have been blended into *one* monument; for as it is usual for travellers to pass the short hour of their visit in examining the avenues of Menec only, they are not aware that a gap intervenes between each of the groups, and they take it for granted that the eleven lines of Menec are continued through the other groups as far as Kerlescant.

It is strange that the local archæologists have just as

imperfect an acquaintance with these monuments as we have in England, and not one, so far as I know, has made a serious study of them. The archæological society of the Department appear to have devoted their attention pretty exclusively to the sepulchral chambers, and to have overlooked these wonderful structures. Had they taken them into their serious consideration, and, as in duty bound and in the interests of science, under their protection, they could hardly have failed to raise a loud and indignant protest against the work of destruction that is going on every year, thereby rendering the problem of their construction and destination more and more difficult of solution. I have passed four successive summers in examining and planning them, and it has deeply pained me to mark in each year the vacant spaces which familiar friends used to occupy. I have called the attention of that society to the fact, and have likewise brought the matter to the notice of archæologists at the International Congress of Pre-historic Archæology, held at Norwich, in 1868. The Morbihan Society has slumbered over my complaint; but I am happy to say that at Norwich a committee composed of English and French members was at once nominated, to communicate with the Imperial Government, with a view to arrest the mischief if possible. I mention this here, as I do on all occasions, because I wish it to be widely known that structures which take the highest rank among the most curious and colossal monuments of the world are, even in these days when their study has become an European scientific movement, being demolished by man's hand and made more ruinous than the furious blasts of the mighty Atlantic and tens of centuries of winter rains had left them.

It may now be said to me, "You have told us what you suppose were not the uses of these remarkable monuments; surely after so long an examination and study of them as

you have made, you are prepared to tell us what you think these uses were." To you I must give the same reply as I have given to others. I am just beginning to learn the alphabet, therefore you cannot expect me to read the language before I have mastered the letters. It is a step in the right direction to have convinced myself that what has been supposed to be one monument, is in fact a number of separate and distinct monuments, each having its own features and peculiarities. There are more monuments of a like nature, with individual peculiarities, in Brittany, which are scarcely known. There are systems of avenues associated with circles in other countries, in Great Britain, in Lombardy, in Africa, as well as in India. Careful and accurate plans of all these should be made, and comparisons instituted between them, and researches prosecuted among them, and possibly their difficult language may in course of time be correctly interpreted. It seems to me that archæologists have all been too prone to dogmatize upon these monuments with an insufficient knowledge of their construction. You may yourselves read in publications of leading antiquarian societies in this country and in France, statements and opinions relative to Brittany monuments which are based upon false premises. Now in endeavouring to interpret the meaning of these celebrated Carnac lines regard must be had and attention given to two points, viz.: to groups of rows of pillars, and pillars arranged in circles, and to these two distinct features here brought into relationship with each other. Mr. Stuart, of Edinburgh, has expressed his opinion that circles of stone are not temples, but sepulchral enclosures. Up to this time, there is no evidence to show that the terminating circles of Menec and Kerlescant were used as burial places. It is true that in the summer of this year (1869) I found fragments of coarse clay vessels and flint scrapers and chippings within the area of the latter circle,

which had just been broken up for planting, but they were too few to afford ground for adopting his view. I have likewise found fragments of similar vessels and flint implements in the disturbed earth of the avenues; but there is no proof of careful interments, such as we observe in the Dolmens or sepulchral stone chambers. The soil in most parts is not more than six inches thick, and rests upon a bed of granite.

With regard to isolated menhirs there may be less difficulty in arriving at a safe conclusion. They are very frequently found associated with structures whose destination was strictly sepulchral. They may have been raised, therefore, to commemorate the death of those whose bodies rest in the tombs at their feet; or they may be symbols of presiding divinities watching over and sanctifying spots which the spirits of the dead may be supposed to haunt. At Locmariaker, the tombs are of such colossal proportions as to induce the belief that heroes of no common order died and were interred there. Accordingly we find menhirs of much larger dimensions than at Carnac, close to the sepulchres, and one menhir, in particular, of astonishing size, measuring 67 feet 6 inches in length. Circles also sometimes form part of sepulchral monuments. It is possible, therefore, that *groups of pillars arranged in lines and in circles, and associated together, may have served a purpose in some way connected with the funeral rites or solemnities that preceded interment.*

There is a feature which is common both to groups of rows of stones and to the sepulchres, which may help to throw some light on the subject, viz., their orientation. By far the larger number of the sepulchral monuments—those, I mean, which are usually termed Dolmens—have their openings or entrances between the east and south points of the compass, *i.e.*, nearly ninety per cent. are so turned, which it must be admitted cannot be an accidental circumstance. So,

too, the avenues are similarly orientated. If, therefore, the builders of the tombs had a religious reason for this arrangement, the same motive must have been dominant in the minds of the constructors of the avenues; and the inference is not without force that the same people erected both. This arrangement may be a token of their religious reverence for the deified orbs of heaven, the sun and the moon.

There are few circles not associated with avenues in the Morbihan. One exists in the Ile-aux-Moines, and a second on Ile-Lanic. The third, at St. Pierre, Quiberon, is not far from a group of avenues. Not one is in a perfect condition.

The first is of a crescent or horse-shoe form, and it has been questioned whether it was ever more than a segment of a circle. The distance between the two points of the crescent is 322 feet.

The second is upon a very small island close to Gavr' Inis, the island being only about 200 yards in diameter. On the south side the land slopes gently towards the sea, and on this slope lie the remains of a circle of 165 feet in diameter. Three only of the stones are standing, the others have fallen. The sea has encroached upon the island, and its stormy waves have carried away a portion of the circle, and continue to destroy both it and the island annually. When Sir Henry Dryden and I planned it in 1868, the tide happened to be low, and we had a good opportunity of observing some of the stones that had completed the circle lying on the beach and rocks, and resting not far from their original places. This is the only example with which I am acquainted in Brittany where the pre-historic people have left abundant traces of the unknown customs which they practised upon such spots, and I trust it will receive, as it deserves, a most careful examination with the spade from the proprietor. Not only is the area of the circle thickly strewn with

fragments of clay vessels, coarse and fine, ornamented and plain, and with animal bones, and stone implements of various kinds, such as chisels, scrapers, knives, and hammers, but the whole of the small island itself appears to be sown with these objects. While we were engaged in planning, I picked up several good specimens of them that were lying on the surface, or had been brought to light by the action of the waves.

The third is 195 feet in diameter, and has been deformed by the cultivators of the land, many of its stones having been displaced. I was informed this year (1869) that the proprietor or occupier intended removing what remains of this circle, because the stones interfere with his agricultural operations.

I know of one example only of a square of menhirs in Brittany, and this is in the Morbihan, on the borders of the parish of Erdeven, and not far from the gigantic Dolmen of Kerconno. The destination of this square I can simply guess at, and suppose that it served the same purpose as the circle.

There are a few stone circles in Yorkshire, on which I wish to make two or three observations. My attention was drawn to them very recently by reading in the newspaper an extract from Mr. Wardell's "Historical Notices of Ilkley, Rombald's Moor, and Baildon Common." His description is not quite accurate. From his account, I expected to find near the Horncliffe shooting-house, on Hawksworth Moor, a small circle of upright stones, enclosed in a second circle of stones set on edge, whereas I found a structure not closely answering this description. There are very few stones set on edge, and I think that originally very few, if any, of the others were so set, and there is no inner circle. There are a few small stones about a modern excavation in the centre, but they appear to have been thrown there at random. The

larger number of the encircling stones have the appearance of having been laid flat, one on the other, in the form of a wall. The stones are generally small (two to three feet in length), and the greatest diameter of the area, which is of irregular shape, is about thirty feet. The monument is called in the ordnance map "Druidical circle."

A second structure, resembling the former, marked on the map as "site of a tumulus," is at a few yards' distance south of the shooting-house on Burley Moor. Here more of the stones are set on edge, and outside of them is a bank of earth and stones, about five feet wide, against which they rest.

A third monument, described by Mr. Wardell, is at a distance of two-thirds of a mile west from this shooting-house; and is a small circle as compared with those I have described as existing in Brittany, the diameter being about forty-seven feet, and the highest stone three feet three inches above the ground. This structure is of a different character from the other two, and was probably destined to serve the same purposes, whatever they were, as those in Brittany. I should be inclined to look upon the two other circular inclosures as being the remains of dwellings, *i.e.*, of hut-circles.

ON THE BRIDLINGTON FLINT IMPLEMENTS. BY JOHN FFOOKS, ESQ.

In a Paper which I read before your Society in 1866, I described the discovery which I had made at Bridlington, that there are four distinct classes of flint implements in that immediate neighbourhood. I have this year collected more implements, that had been thrown up by recent ploughings on the same fields, and I am glad to find that they confirm my previous conclusions in every particular; and they have explained to me very important points relating to the mode of warfare in those early days, as well as illustrated the social

habits of the people who used them. In 1866, I was so careful not to mention anything that there could be a doubt about, that I left many things for future investigation which I had then obtained a glimpse of, but could not confidently describe. I now take this opportunity to relate to your Society the facts which have become known to me by a careful examination of a large number of each kind of implement and weapon; associated as they have always been, in my mind, with the manner in which they were left on the fields; and this Paper will complete the history of the flint implements of Bridlington so far as I have been able to ascertain.

The people who used flint implements as the hardest substance that they could form into a weapon, or a tool, must have been very primitive inhabitants. Men could only have used wood, and bone, or soft stone, before flint; they did not necessarily use flint before other kinds of stone, and very probably they did not do so, as I have found all their weapons and implements made of soft stones of various kinds, but the soft stone implements have suffered far more than the flint ones from the ruthless effect of civilization. The farmers dislike to see stones lying about their fields, because it disfigures their finished appearance. Though I believe small stones, in dry seasons, prevent the rays of the sun absorbing the moisture from the roots of the growing crop, and that they really are beneficial; but no distinction has been made even between large and small stones, and thus all have been picked up and carted away; and I have often seen valuable implements being ground to dust on the roads from this cause.

The white flint appears to have been first used at Bridlington, probably because it was the most easy to manage, and the implements could be made larger than in grey flint. Most of the commonest implements may be found there

made of this flint, but it is very difficult to get them moderately well chipped. They appear generally to have been roughly broken into shape, as a mere novice would make them, and a collector will immediately discover that, if he is fastidious regarding the workmanship, he cannot find a specimen to please himself; but no archæologist would confine himself to beautiful forms, if he wishes to appreciate the evidence of flint implements.

The art of chipping was strictly progressive, as well as all other arts have been, commencing very rough and ill-formed, and finishing beautifully even and regular; and if we carefully examine the improvement in the method of manufacturing the implements that are left, and consider the many useful purposes for which they were adapted, we shall discover that there is abundance of proof that the three first tribes who inhabited Bridlington considerably advanced in civilization. I believe there is no doubt that they each manufactured their own implements, as I do not find the same pattern exactly followed in many instances; and those who understood the art of chipping flint sufficiently well to form perfect implements, were either not inclined to take the trouble to make them all well, or they found that for ordinary purposes it was not necessary to do so, for I have found at least fifty inferior implements to one superior, even of grey and red-coloured flint; and I wish everyone to understand that the people who used flint implements were contented with very inferior chipping to what they find in my collection, and probably in any other.

Whilst I was in the act of collecting them, I indulged freely my own speculations regarding the kind of lives these early people must have led. I have since gone amongst our own poor, and observed how they live. I have also partaken of the comforts of a log cabin, in the far West of America, and witnessed the contentment and rude happiness of settlers

in the newly-reclaimed wilderness; and I have lived in the woods, far away from the sound of the busy world, and have seen the Red Indian in his wild abode: and after this experience, when I have gathered up the flint relics of the people who lived at Bridlington at least three thousand years ago, with nothing around them but a population of uncultivated people, such as may be met with along the frontiers of any newly-settled country, I have not been inclined to despise them, on the contrary, I know they may have been far less vicious than the pioneers of our modern civilized community; and it is not probable that they had any spirituous liquor to madden their intellect, and spread desolation among their people. I know they were in the most primitive condition; that their wants were few, and easily supplied. They built their log hut, which was their home. The land was all open to them to be cultivated, and well covered with wild animals. It only required the ingenuity to invent or form hooks, spears, and arrows, and tools to prepare the surface of the soil, and they could insure abundance of food; and in the most primitive condition this was the *sine quâ non* of existence. Now, these relics show that they were capable of inventing or imitating these things for their use, and of accumulating inventions, and becoming thereby more masters of creation, and improved in their social condition. Their conventionalities restrained them, and were enforced without a doubt in the same manner as the native Americans and the Maories regulate their society. Their instincts were the same, and they reasoned as men. From this starting-point we may trace the evidence of their improvement by the implements they have left on the fields; in the remains of their homes; by their fortifications and enclosures for their cattle; their stone circles for religious purposes; as well as their tumuli, cromlechs, and memorial pillars; but I have to confine myself to their flint implements.

WEAPONS.

At first, their chief weapons were a stone, which they threw; and a stick, which they fashioned into a club to strike with. Now it is remarkable that from these roots I have been able to trace a connecting link with the weapons of flint which are found at Bridlington; and it is chiefly to illustrate this fact that I have written this Paper, as it stamps the implements which are found there as the very earliest that can exist upon this island.

The sling-stone is familiar to every one; but we should not omit to remark, that when we compare the feeble force of a stone thrown from the hand, and the short distance it can be sent, with the power and distance which a stone can be hurled from a sling, the invention of the sling in the first ages of man was quite as important as the modern improvement of the rifle compared to the old flint gun, to this generation.

It is impossible to decide when the sling was invented, but we know it was used at a very early period in the East, and might have been brought to this island by the first emigrants. I find, however, that they did not confine themselves to the sling, as I have picked up very large stones which were undoubtedly used as weapons; too large and too rough for throwing from a sling, although they were used by the same persons who used sling-stones, as both kinds were left together, with other weapons, on the ground where they had been fighting.

The variety of patterns of sling-stones is very great, and represent the ingenuity and taste of the inventors. There are different sizes of circular balls of flint, and circles of flat flint, or flat on one side and elevated nearly to a point on the other; square flints of different sizes, with flat and uneven surfaces; and triangles of the same kind; and ovals, more

or less exactly chipped into form, and discs; and oblong pieces with flat or pointed ends, and some with several sharp projecting pointed edges, others with only one pointed end, nearly resembling the dart and the spear head.

The other primitive weapon was the stick, of any size. A mere straight stick would inflict punishment, but not be a very deadly weapon; but when the root was fashioned into a knob at the end of the stick, it became a more dangerous weapon, from its concentrated weight increasing the velocity and effect of a blow. The ingenuity of these people added to the power of this weapon, by substituting a knob of flint, which they fastened on by a thong of raw hide, that became tight and firm when it dried and contracted. This was, undoubtedly, a most formidable weapon, and the proof we have of how much they valued it for fighting is, that nearly every set of weapons left on the fields have one or more of these stone knobs among them. They were formed of various shapes, which gives them additional interest. The first which would suggest itself, is simply round, chipped over the surface, to admit the tightening of the thong which fastened it on to the stick.* A short neck was added, the size of the stick, to which it was fastened. At this point, a singular development of the form of the knob is presented to us. Some ingenious observer of natural objects must have remarked how easy it would be to convert the knob into an imitation of the head of a bird, by merely leaving a projecting point on one side; and having advanced so far, the bird's head, and the snake's head, became a prolific subject of imitation, but as the bird's beak is only slightly developed in a projecting point from a round knob, I do not think I should have detected the intention, if it had not been more fully expressed in other weapons, which in the most perfect

* It is presumed that a cup was formed in the natural knob, to receive the stone knob, or it could not have been tightly fixed.

specimens that I have found is nearly a fac-simile of a bird's beak, with a slight comb, and the head of a snake.

BIRD'S-BEAK AND SNAKE'S-HEAD FLINT WEAPONS.

A bird's-beak or snake's-head flint weapon, with numerous modifications, became a distinct weapon, which nearly every man appears to have carried in addition to his sling-stones. But very few persons were capable of chipping the imitation of a bird's head or snake's head out of a flint core accurately, and this pattern is consequently very scarce. The most common modification was a simple open triangle, or one angle of an open, square piece of flat flint, with the end that was intended to be attached to the handle left rough, the other end either pointed or left blunt, or squared. They also inserted a simple beak into a knobbed stick, which made the most formidable weapon. The beak was one or two inches long, thin, narrow, and sharp at the point, and excellent chipping is shown in this description of beak; on this account I consider it one of the latest improvements. I look upon this weapon as the best substitute for the sword which the aboriginal people possessed. The stone knob was heavy enough to kill with a single blow on the head, and the beak would inflict a deadly wound if it penetrated the skull or the breast.

SPEARS.

The spear is so well known which is made of steel that we are naturally inclined to presume it was one of the most common and effective weapons that the ancient Britons possessed; but I find this is far from having been the case. Its origin was, no doubt, a pointed shaft of wood, which subsequently was made a more dangerous weapon by substituting a point of flint, in precisely the same form as the arrow. But the first three tribes who inhabited the neighbourhood of Bridlington were by no means satisfied with the

mere point of flint, as I have found forty varieties of form, and many of them differing so widely that they may be called distinct weapons of the same class. The sharp point was the most general form, but some of them were made round at the point, or quite blunt, as if the mere force of the arm was relied upon to inflict a deadly wound. I have only found two varieties that have sharpened edges that would cut their way into the flesh. One form invented is clearly the original of the halbert of the feudal ages. It has a point and a projection on one side, which is a broad, sharp edge, to strike with, and being struck off a large core of flint, its weight would add considerably to the effect of a blow which might be given with it. The great number of different forms of the spear, as of every other kind of weapon, is a proof that each person made his own implements, and that the early Britons were exceedingly earnest and intent upon inventing new and effective weapons, and that they fully expected to bring the spear to such perfection as to take the place of some other weapon; but in this they failed, as it required the knowledge of metal to be accomplished, while the inferior workmanship exhibited in nearly all the specimens is a proof of the very early period of their manufacture, and as there are none better formed than those which I have found, within the district, the successors of the first tribes could not have used spears that were chipped in a different manner. Yet perfectly different specimens are found within three miles of their settlement, as I mentioned in my last Paper.

I have good reason to believe that spears were not more commonly used in war than arrows, and that neither of them were considered very efficient weapons for fighting with; still there is no doubt they were preferred by a few, who were probably dexterous in their use by constant practice, as they are both occasionally found among the relics of war;

but where there is one spear or arrow-head found, there is certainly a hundred beaks or knobs.

HAND-FIGHTING STONES.

Another weapon, which is not generally known, was pointed out to me by Mr. Edward Tindall, of Bridlington. It was used for holding in the hand to strike with. The one he showed to me was a native flint, with a long projecting point and an uneven head, which the fingers could fit over to tighten the grasp.

I have since found many different varieties of these fighting stones, cut expressly for the purpose—round ones with a pointed end; and flat flints, pointed; and others with a jagged edge; and long, round pieces of flint, pointed at one end; and some very rough nodules of flint, with the natural projections pointed. This weapon was in much esteem, I have no doubt, as it is constantly found with other weapons.*

HATCHETS.

Flint hatchets were very commonly used as weapons, when they were made small for the purpose; but I have never found large hatchets where there had been fighting, and the small hatchets are not carefully sharpened, so that it appears with this weapon, as with others which I have mentioned, the ancient Britons trusted more to the force of their blow upon the bare head, than to the keenness of the cutting edge.

THE DAGGER.

The dagger appears to have been a well-known weapon; but I should judge that it was a late invention, as those which I have found are exceedingly well cut—some about

* A bas-relief in Athens represents a fight with the Amazons, with hand-stones; and on Trajan's column, at Rome, the Roman Legions are represented as attacking an enemy who are defending themselves with hand-stones.

two inches long—are very thin, and sharp-edged. They were no doubt fastened to a bone blade and handle, in the same manner as the bronze blades that have been found in the tumuli indicate that they were made.

I have a flint knife that appears to have been fastened to a handle in the same manner, which leads me to suppose that the dagger is the offshoot from the knife, and that such knives were used as daggers.

The dagger is the only weapon that appears to have been intended by those early Britons for striking below the head, and we must conclude from this circumstance that their mode of fighting was always overhanded, and that they were unacquainted with any method of attack which was similar to our bayonet charge. They appear to me to have trusted to a hand-to-hand encounter, with their blunt spears, their small hatchets, their tomahawks, their knob-sticks, and bird's beaks, and hand-fighting stones, and to have reserved their sling-stones for pursuit. They never carried more than four kinds of weapons to fight with; and those who were the best provided with weapons I have found possessed a bird's beak, two small knobs, three or four sling-stones, and a hand-fighting stone; or varied in this way—a spear, an arrow, a knob-stick, and sling-stones.

A flint knob, or a bird's beak, or snake's head, and sling-stones, are almost invariably found with dress-fastenings, while the other weapons vary very much, according to the inferiority or apparent superiority of the person who possessed them. Some of the sets of weapons show that the person was provided with the best manufactured weapons that were made; others appear second-rate, but still good; while others appear not to have possessed any good weapons whatever; and the dress-fastenings which are found with them invariably correspond with the quality of the weapons that lay near them. So much is this the case that I have felt as

I picked them up that I must renounce my right of reflection before I could refuse to recognise the fact.

THE DART.

The dart is a very peculiar weapon, which I do not comprehend the use of. There are at least four different shapes. One of them is a mere triangular point of flint, varying from an inch to an inch and a half long; another two inches long and pointed at both ends, but one end is twice as long as the other, and as sharp as possible; the third, which I have in soft stone, was made flat on the under side, and triangular on the upper, with the front, or long end, pointed, and the other end contracted nearly to a point. I have the same shape in flint, much larger. These darts were generally made with very little attention to accuracy of shape, and some of them are exceedingly rough weapons. The fourth kind of dart was certainly intended to be thrown from the person in some manner, as it has been found in the skull of a buried warrior in a tumulus. It is the form of a leaf, thin, and sharp at the front edges.

I think it will strike those who hear this Paper read, that there is a peculiar originality and primitive simplicity in the weapons I have found, which were the only kind that the earliest people who inhabited the neighbourhood of Bridlington were acquainted with. I do not know that the inventions made any progress there; but it is evident that wherever the knowledge of such weapons was derived from, none could have been of earlier date in this new world. They consist of a mere stick and a stone, made effective and dangerous weapons by subsequent alterations and additions; and by the time these were improved to the utmost extent of their ingenuity, the inhabitants had learned to cut flint much more dexterously than they could at first; but when the straight method of chipping was only understood, the

Romans had not invaded Britain, nor had the people who introduced metal into this island arrived on this shore; and if there could have been a doubt of the reality of the tools (which I described to you in my former Paper) having been used by a people who lived before metal had been introduced, the primitive character of the weapons which I have since found removes every doubt of the fact, and I now expect that I shall be believed to have found distinct evidence of three tribes who inhabited Bridlington at an age at least as early as the erection of the stone circles and avenues at Avebury, and before the existence of Stonehenge.

HOUSEHOLD IMPLEMENTS.

From the evidence of the caves and the drift, flint knives may be considered to be the invention of our antediluvian forefathers; we cannot, therefore, feel surprised that wherever the descendants of Noah have existed in this new world, we find a great number of knives: but those which I have seen of antediluvian type may be classed under the head of flakes.

The aborigines at Bridlington exerted their inventive or imitative genius quite as much in these useful household implements, as they did in their weapons. I have found ten distinct patterns of knives there, including flakes, made of various sizes, for different purposes; some several inches long, and strong enough to divide the joints, or strip off the skin of an animal; and others exceedingly small, as if they could be of no service but for a woman to sever her thread with, as a substitute for scissors. Several of the blades of these knives do not materially differ, except in length, from those which are still made in steel. Some have a neck formed at the end of the blade, to tie a loose thong of leather round, to suspend to a girdle, to prevent their being lost. Even those which are known as flakes, because they are thin and were evidently struck off a core at one blow, were first intentionally

formed so that they would be suitable for knives by having slices cut triangularly off the upper side, to produce two cutting edges. We can easily imagine how useful these flint knives were to those early people, when we consider the various purposes for which we employ steel knives at the present time, for although they were incalculably inferior to sharp steel, yet to them they must have been a substitute for many tools which have been since invented.

Scrapers may be classed next to knives as the most useful and common implements which the aboriginal inhabitants of Bridlington employed for various purposes. They are both numerous and of a variety of sizes and shapes.

We may probably assign the first use of them to have been to clean raw skins, and to prepare them for clothing, as curriers do at the present time. They were also adapted for splitting willows, and for stripping off the bark, and cleaning them for wicker-work; and I am led to believe they were used for this purpose, from my having found a large size, and a very small size, in considerable numbers with wicker-workers' tools.

The thumb flint is a variety of scraper, as the modifications of its form is sufficient to prove. Some are quite round, others have a projecting side to fit the point of the thumb, and extends nearly its length, to give more resistance.

The most important use to which the scraper has ever been employed is, for giving an even, smooth surface to flat boards. To accomplish this, the aboriginal people invented a plane of flint, which was fixed to the front of a frame of wood; but this has since been changed by the modern application of the scraper, which is passed through a flat wooden frame, and fixed by a wedge. The original flint plane was made flat on the under surface, and elevated, more or less, on the upper, and formed straight on one side and obliquely on the other that it might scrape or cut as it was

forced forward. The cutting edge of the plane was formed by the sharp angle of the upper and under surfaces, which severed the rough surface of the wood by its oblique motion.

It is obvious that the ancient Britons could not get over the obstruction of constant fracture in a straight thin flint edge if forced forward over a rough surface; and, therefore, they adopted the angular oblique edge, which overcame the difficulty. I do not imagine that this implement could have been so efficient as the modern application of the square scraper; but it is evident that we are indebted entirely to the power of resistance of steel for the efficient work performed by the modern plane, and in point of scientific arrangement the oblique angular edge was not less ingenious than the subsequent application of the scraper, and the principle involved is the same in both implements.

CLOTHING.

It has been ascertained that a coarse texture of flaxen cloth had been fabricated at a very early period, and before the sheep had been imported into Britain; but the skin of the wolf was still worn by the people, with its warm fur next to their skin, to shield them from the inclement climate; and if skin clothing was commonly worn, it would be surprising if we could only find the implements with which the raw skin of the wild animals were prepared for use. I have found amongst the flint relics at Bridlington two sets of implements, that appear to me to have been employed in the manufacture of skin clothing. One of these is a variety of sharp-pointed flints, which I consider were used for making small holes in the skins, to pass a thread of some kind through, to fasten the skins and different parts of the garments together. The other implements were apparently formed to press the seams after they were sewn, and I have

found these two kinds of implements together, as if they had been used by the same person.

The sharp points are in some instances nothing more than carefully cut points of flint, about an inch long; others are short points projecting from pieces of flint of no definite form, whilst others are projecting points from the centre, or at one angle of a square piece of flint; but all indicate by their form that the point has been the only object for which these implements were made, and as it would require such a point to make holes in skins to pass a thread of any kind through them, I think the most natural use for which these points could have been applied is the one that I have assigned.

The seam pressers are made in a very definite shape. They are all flat pieces of flint on the under surface, and rounded on the upper; and there is a handle to most of them, which is formed by chipping the flint away, to leave a neck, dividing the handle from the body of the tool. I have a great many specimens of them, with very little variation of form.

FISHING.

The fish that abounded in Bridlington Bay must always have been a good source of supply of food for the inhabitants, and it is natural that various means should have been adopted for catching them. I have found many fishing-hooks of different sizes, but the shape of them is not exactly similar: some are very rough specimens, but when covered by a bait they were probably found efficient for the purpose; others are carefully cut, and appear to be as well adapted for holding large fish as any that are manufactured of fine steel. Great skill in the art of chipping flint into form is exhibited in the curved and rounded hooks, but to avoid the difficulty that most persons must have experienced to produce a perfect shape, a method of cutting the flint at first flat, and then

chipping out the hollow for the hook was adopted, which answered equally well for catching some kinds of fish; but to land the great sturgeon, cod-fish, and ling, must have required the best flint implement they could manufacture.

I have found also a great many spear-points, of a peculiar shape, that appear more appropriate for spearing fish than for the purpose of war, and I have little doubt that the fishermen in those days resorted to this means of securing some of the flat fish that lay on the sand, and those which will not take bait on a hook.

Added to these two methods of catching fish, there is little doubt that they made nets.

TOOLS.

In describing the different sets of tools which were used for various purposes, in my last Paper, I did not explain the variations of form which those tools had undergone during the period that the first tribes were inhabiting Bridlington; but I should not convey a correct idea of the active state of their minds in that very early age, and how much we inherit from them, if I left this untouched.

Amongst some of the best known implements in museums are the soft stone hatchets, which, from their size and excellent shape and finished form, have always been preserved by the ploughmen, and appreciated by the public. Real stone hatchets of this kind are, some of them, beautifully formed and finished, but they are all of them of a much later date than the flint implements which are found at Bridlington, as they did not exist before the grinding stone had been invented, as their surface bears sufficient evidence.

I have found a very ancient hatchet, that discloses its age by its form as well as its finish; it is quite distinct from those which are found outside the boundary of my search, from being made sharp-edged at the side, instead of at the end; and it is slightly curved at one end of the cutting edge.

Hatchets made of flint are very various in shape and size. I have already mentioned a small-sized hatchet which was used in fighting; there are other small hatchets which were evidently made for cutting off small willow sticks for wicker-work, and a specially small kind, carefully made, which appears to have been intended to sever the ends of the willows after the basket, or other object of their art, was put together; the cutting edge of these is not more than an inch wide. Some hatchets are large sized and nearer our modern shape, sharp at the edge, and heavy enough to cut off a large piece of wood.

The hatchet which I found with the carpenter's tools is a thin flake, chipped over the upper side, and sharpened at the edge, with a shank formed by cutting out a right angle with the blade to fasten the handle on to. Another kind of hatchet is similar to a wedge, which probably was the origin of the invention, as flint readily splits into the form of a wedge, with an exceedingly sharp cutting edge.

CHISELS.

The primitive shape of the chisel was very different to the form that was afterwards employed. I described one that I found partly rubbed down to sharpen the edge, and cut an exact chisel shape, as we now see chisels made of iron which are used by stone masons; but at the earliest period, when flint was the material of which they were made, they were only intended to chip wood with.

The first shape of the chisel was, undoubtedly, a rather long wedge. This form was varied by cutting two slices of flint off a core, in a slightly triangular pointed form, and then severing the chisel complete from the block, which left a broad head to strike upon, and a sharp edge, an inch wide, to chip with. This kind is found of various sizes.

I have found numerous small chisels, an inch to an inch

and a half long, cut moderately thin, carefully chipped into shape; they are miniatures of the long chisel, and appear to have been fitted into handles. This pattern was made longer, to hold in the hand without a handle, when the head was rounded; but before the true flat-sided chisel pattern was adopted, it was the custom to cut the whole length on one side nearly flat, and the other angular.

I have likewise some chisels three inches long, formed by being chipped off on both sides to form the edge, which is about an inch wide, with flat heads, but by no means carefully made.

In after ages, stone chisels went through various modifications, and all of them were ground down to a cutting edge, instead of being chipped. They then made some of an oval form, gradually reduced in size towards the striking end; while they made others long and narrow, and of an uniform width throughout, with triangular slices cut off their face.

Others were nearly flat, with rounded sides, and contracted throughout their length nearly to a point. Chisels of this description must have been continued in use down to the introduction of steel, and probably later, but none of them are found in the immediate neighbourhood of Bridlington.

There was another kind of chisel in very early use among the ancient inhabitants, made expressly for cutting out hollow surfaces, such as bowls, from solid pieces of wood. I have found them made of a curved piece of flint with a flat head and a sharp edge; and, likewise, made of a straight piece of flint chipped off at an acute angle at the back of the implement, with a pointed head to fit into a handle; and another, hollowed in a gouge shape, with a point to fit into a handle.

DRILLS.

The drill appears to me to have been gradually developed, until it assumed the form of the auger. It must have

originated in a sharp, long point of flint, of which I have found numerous examples. Then sharp edges were found of great importance, and they were formed by angular sharp sides being chipped the whole length of the long point of flint.

Another very distinct shape was given by chipping notches out on both sides of a round point of flat flint, to form a separate head, and bevelling both sides of this head in opposite directions.

Others are formed of a triangular sharp point, with another point at the reverse end to fit into a handle; and I have found natural flint screws sharpened to form drills, and others chipped crossway to make the screw.

Long points of flint, chipped carefully into form, were very much used, probably for cutting out holes that were too large to be drilled out, for mortising, or for punching out old wooden pegs.

I have a great many other tools, of peculiarly good form, but they are not represented by modern tools made of metal, and the use of them is consequently unknown; they were probably only useful during the period that flint was the hardest substance employed for mechanical instruments, and to persons in their primitive condition; but, notwithstanding our ignorance of their intention, the fact that they exist with so many which we do know the use of, conveys a most convincing proof that the people who made them and used them were active, intelligent, and persevering, and continually improving their resources and condition of life, and though their power of applying their genius was limited, from not having discovered the method of using metal, still whilst flint was in fashion, it was no doubt sufficient for their requirements; and we may conclude that the range of their invention was more strictly confined by their moderate desires, and the number of their population, than by the

degree of refinement which they had attained; for how can we call a people destitute of refinement, and of the comforts and conveniences of life, who joined in communities, and built their huts in the regular order of streets? who were acquainted with the uses of fire, which we know by their having made bread, and why should we suppose that their cooking was confined to this act alone? and who manufactured such a variety of weapons, both for the defence of what they considered their wealth, and to provide themselves with the best means to gratify their appetite for a variety of food—arrows for birds and the smaller game, darts and sling-stones for the larger animals, and hooks and spears for catching fish, and from the skins of animals fabricated clothing of the most comfortable description?

We may not be able to state the degree of refinement of their manners, nor describe their institutions of government, but we certainly can conjecture, from the nature of the relics they have left, of substantial, and even gigantic proportions, as well as minute flint implements, that they were no mean savages destitute of reason and depending upon their instincts for subsistence. What can be more characteristic of comfort, and a certain degree of refinement, than the knowledge of manufacturing wicker-work? and so excellently finished that the polite Romans, when they came as conquerors to the island, coveted the possession of their works of art and sent them to their Imperial city. And of what use would such tools as the flint saw, the chisel, the drill, the hatchet, the hammer, and the plane, have been to them if they had been mere savages? Depend upon it these were not playthings, or inventions of fancy, which wiser men than they have converted into useful implements. They are surviving records of the personal vigour and intelligent action of a people who possessed determination to promote their own happiness by the advancement of science and art.

And if their mechanical tools and farming implements are indications of their assiduous labour, are they not a direct proof that their line of improvement was in the same direction which their successors advanced, and which we are following at the present time? But probably the evidence of their appreciation of personal ornaments, which were elegant in design, assisted by a variation of colour and careful execution, although they were merely made of flint, is the strongest proof that they had attained a degree of social improvement which placed all human happiness within their reach; for illiterate savages are not manufacturers of works of art, but for ever remain content with natural productions to decorate their persons, and no people would commence with the beautiful and ascend to the useful arts, but, on the contrary, their first attention would be turned to the means of existence, and be followed by the gratification of taste.

DRESS ORNAMENTS.

I described the existence of dress-fastenings in my last Paper, but I went no farther at that time, because my collection of ornaments was by no means perfect. I have been fortunate in finding many more relics of this kind during this season. They consist of the dress-fastenings of various kinds, and of several patterns of brooches and breast-pins, and larger forms of worked flints, which were worn as ornaments. One of the commonest patterns of brooches is formed of a piece of flint, straight across the upper part, from two to three inches long, with a pointed or round projection nearly in the centre below, leaving the two ends extended for fastening to the dress; one of these ends being slightly pointed and longer than the other. There are large and small sizes of this pattern.

Another represents an obtuse angle of flint, half an inch wide, and a variety of other sizes.

Others are circular and triangular flints, which were set in some other substance, probably bone; and some have three, and some four equal projections from the centre.

Others form a large angular point of flint, with a lesser projecting point above it, and others are cut the ordinary lozenge shape.

A very pretty pattern has a curved neck, with a larger triangular-pointed head, which in the most perfect specimen represents a snake's head, very distinctly cut, but the workmanship degenerates in the ordinary examples into a mere curved piece of flint, with a small projecting shank for the neck.

There are also straight patterns of flint brooches, chipped out at equal distances, to make the line irregular, and some are cut in the form of a prism, and others are curved throughout the whole length, and straight pieces are left larger in the centre than at the extremities.

Dress pins are cut various lengths, either straight or curved at the upper end, while some have a knob rudely formed. There are two patterns that were much admired, if I may judge from their frequent use, one of them was a short pin, with a flat head, cut round, an inch in diameter. The other is a straight pin, with a cross head, of larger size.

The brooches and pins are almost entirely cut out of grey flint, which illustrates my idea that the people who used the grey flint were the same race of people who have shown such artistic skill in France, Italy, and Greece, from the earliest ages. That they were a distinct race of men, I have shown by their always having made their implements of this flint, and of a smaller size, compared with the red and the white, and invariably neater, and exhibiting great taste in the execution; at the same time expressing feebleness and a want of physical power, which the red flint implements so strongly develop. In expressing myself thus, I am follow-

ing my observation, that physical power and the energy of a strong will are always made evident in the grosser forms of whatever implements are invented and used by a people, and that taste and ingenuity and patient painstaking labour is characteristic of a more effeminate and delicate organization; and that this difference of character has been distinctly developed in the races who have taken the lead in the world.

It would occupy too much time and space to enter into the details of this subject in this Paper, but I may mention the striking difference of features which identify two such races of people who have always inhabited Europe, and who have been separated as much by their natural peculiarities as by the boundary lines of their territory.

Herodotus gives us the names of two distinct divisions of people, but we cannot positively separate them by the light of his description. He says, "The Celts are beyond the pillars of Hercules, bordering on the territories of the Cynesians," and "inhabit the remotest parts of Europe, towards the west," and that "the Ister (Danube) has its source in their territory." We can only understand by this description, that the Celts were the people who dwelt close to the northern boundary of France in his day, and this people was known afterwards to the Romans as the Germans. They are, and always have been, a fair-complexioned, light-haired, robust family, and they claim to have possessed that territory from the remotest ages. The Cynesians were, in the life-time of Herodotus, the inhabitants of France, but what race they were we can only conjecture, though the conjecture may be based upon very striking facts. France was named Gaul by the Romans, because the Gauls possessed it, and this is nearly all we know from that source about them; but we must remember the ancient authors did not attend to the previous history of other people, particularly if they were their rivals.

Strabo, however, assists us by a word: he says, in describing the Britons, that "their stature was taller than the Gauls, and their hair less red." Now we cannot believe that the people who inhabited France were red-haired from all time, seeing as we do that they have since become black-haired, and the size of these two races are in every respect the antipodes of the other. Mr. Greenwell adds a link to this chain, by having found a plaited tress of hair in a vase buried in a tumulus at Pickering, which was auburn, or more German than the red. Now the Gauls can be traced from India to England, and the Calmucks are said to be red-haired men to this day. They were conquerors, who overran Asia and Europe, and settled in France, because the land extended no farther, but they were not the Cynesians. There has always been the race of people in Europe who have the distinguishing characteristic of a clear white complexion and jet black hair, rather small in stature, with slight muscular development; and the people with this coloured hair is still prevailing in France, Italy, and Greece. How can we account for this, unless it is the consequence of the black-haired race having been the aboriginal people who occupied that territory, as the light-haired people occupied Germany, and that their conquerors did not bring wives with them, but from preference took the black-haired women they found in the country, as the red-haired men have always done since the days of Acis and Galatea, and in a few generations the original stock prevailed? This has been the fate of invading armies in general, where they have not expelled the first inhabitants. And what has been the case in the British Islands? There are well-known black-haired and red-haired races in England, Wales, and Scotland, who are supposed to have been driven to the extremities of the island by the conquering German and Scandinavian races, who were light-haired or brown. Those who were expelled from the interior

were the descendants of the original black-haired and red-haired races, and those who inhabit their territory now are the light-haired races (speaking only with reference to the prevailing colours). The blending of these clearly distinguishable races has created much diversity of colour in the hair, but the broad fact remains; and if we look back to the earliest period, before any intermarriage had produced the variations which now prevail, it is easy to comprehend that where the light and black-haired races were following each other, and settling side by side,—as they clearly did at Bridlington, when flint was the only substance which was known for making the implements they used,—their habits and their tastes were different, as they ever have been on the Continent, where they came from; and from this cause we find distinct classes of flint implements where they lived.

At the conclusion of the Meeting, the members of the Society and the *elité* of the neighbourhood were sumptuously entertained at a banquet, given at the Red Lion Hotel, by the Mayor and Corporation of Pontefract, and at which about eighty ladies and gentlemen sat down. His Worship presiding.

REPORT OF THE PROCEEDINGS

OF THE

GEOLOGICAL AND POLYTECHNIC SOCIETY

OF THE

WEST-RIDING OF YORKSHIRE.

1865-6.

SMITHSONIAN INSTITUTION
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Contents.

PAGE

MEETING AT DONCASTER, November 22nd, 1865 423

"On the Coins of the Ancient Britons, and more particularly those found in Yorkshire," by John Evans, Esq., F.R.S., F.G.S., F.S.A., &c., of London 423

"On the Occurrence of a Lead Celt in Lincolnshire; with Remarks on Celts generally," by Henry Denny, A.L.S., &c. 436

"On Local Nomenclature, as derived from Saxon Settlements in South Yorkshire," by the Rev. Scott F. Surtees, Rector of Sprotburgh 446

"On the Little British Kingdom of Elmet," by John James, Esq., of Sheffield 452

PAGE

"On Impressed Limestone Pebbles, as Illustrating a New Principle in Chemical Geology," by Henry Clifton Sorby, Esq., F.R.S., of Sheffield 458

MEETING AT LEEDS, August 6th, 1866 463

"On the Flint Implements and Weapons found at Bridlington," by John Ffooks, Esq. ... 465

"Notice of Early British Tumuli on the Hambleton Hills, near Thirsk," by Henry Denny, A.L.S., of Leeds... 488

"On the Pleistocene Mammals of Yorkshire," by William Boyd Dawkins, M.A. (Oxon.), F.G.S., &c. 502

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1867.

PROCEEDINGS

OF THE

GEOLOGICAL AND POLYTECHNIC SOCIETY

Of the West-Riding of Yorkshire,

AT THE SIXTY-SEVENTH MEETING, HELD IN THE COUNCIL-CHAMBER OF THE GUILDHALL, DONCASTER, ON WEDNESDAY, NOVEMBER 22ND, 1865, AT TWELVE O'CLOCK AT NOON.

The Right Hon. LORD HOUGHTON, D.C.L., in the chair.

The Chairman having read a letter of apology from Dr. Vaughan, Vicar of Doncaster, who was to have presided, announced Charles Bartholomew, Esq., of Broxholme, as elected a member of the Society.

The Chairman called upon JOHN EVANS, Esq., F.R.S., F.G.S., F.S.A., &c., of London, to read the first Paper, of which the following is an abstract.

ON THE COINS OF THE ANCIENT BRITONS, AND MORE PARTICULARLY THOSE FOUND IN YORKSHIRE.

In bringing before you a brief notice of the Coins of the Early Britons, I may state at the outset that considerable diversity of opinion has existed amongst antiquaries as to whether the Britons really had a coinage of their own; and if so, as to the period of the first introduction of a coinage into Britain. Leland, our earliest historian of any note, says that in all his travels through England he could never meet with one British coin; and he accounted for their

absence by the assertion of Gildas, that the Romans would not allow any metal to be struck in the country unless with the image of Cæsar. Subsequently, however, coins and various relics were discovered in different parts of England; and, as the attention of the learned of those days was gradually given to these objects, it was then found that Early British Coins did exist, and Camden, in 1586, was the first to publish figures of fourteen undoubtedly British coins.

The popular opinion that before the invasion of Julius Cæsar the ancient Britons had no coinage, but used rings of iron and brass, rests on a disputed passage in Cæsar's own writings; one reading of which mentions the use of golden coins instead of rings, which would seem, from subsequent discovery, to be more in accordance with fact. When Cæsar landed he found the country inhabited by various tribes who were not natives of the country, but chiefly immigrants from the continent of Gaul, who had driven the original inhabitants into the interior. This immigration led to a constant intercourse between the various tribes of the two countries. When we come to consider the character of the early commerce of this country with other nations, and the connection which, long before the days of Julius Cæsar, existed between the people of Britain and those of Gaul, the supposed unacquaintance of the former with the use of money is quite incredible. There seems to have been a trade in tin, as early as 445 B.C., carried on between Britain and Gaul, and thence by land through the continent of Gaul. It was therefore probable that the Britons would gain a knowledge of coinage not very long after the Gauls acquired that knowledge themselves. In the year 600 B.C., a Greek colony was founded at Massilia (Marseilles), in Gaul, the civilization of which gradually spread into the districts around. It was here the original of all our coinage was introduced about 330 B.C., the ancient and beautiful Philippus, a diagram of which coin is

exhibited. On the obverse of this is a bold figure of the head of Apollo encircled with a laurel wreath, or, as some writers suppose, the head of young Hercules; and on the reverse a chariot drawn by two horses, and underneath the name of Philip. These coins were very soon extensively imitated by the native inhabitants of Gaul, and in course of time these imitations came over to Britain and were again imitated in this country. Thus the gold Greek Philippus was the origin of the coinage in Gaul; and the Gaulish imitations of it, there is no doubt, formed the first coins from which the Ancient Britons took their copy. The variety of the figures upon them, and the changes which mark them, enable us to form a pretty accurate opinion as to the time when they were issued; as the greater the divergence from the prototype, the later probably will be the coin.

If, on the contrary, the art of coining was unknown in Britain until the time of Cæsar, the coins must either have been struck on the Roman model or on that of the later Gaulish coinage, in which nearly all resemblance of the original Macedonian types had been lost, and which shows also unmistakable signs of Roman influence. Again, we should have a coinage of the metals then in use—gold, silver, and bronze—and not one of gold only, as it would have been had it originated at an early period of the Gaulish coinage. Now let us see what evidence the coins themselves afford upon this point. We find coins of gold of a type which never occurs on the inferior metals, and which, though occasionally found in France, are of much more frequent occurrence in England, and are therefore, in all probability, of British origin, and on which the laureate head and the charioteer in the biga can at once be identified, though they are both considerably modified, and these are, without doubt, the earliest of the British series. Now as regards their date. The death of Philip II. took place B.C. 336, and we may

safely infer his coins began to be copied or imitated in Gaul as early as B.C. 300. But as these imitations would be merely servile copies retaining the name of Philip on the coins, while those of the Britons exhibit various innovations, such for instance as the addition of drapery, or a gorget to the neck of the laureate head, and a bandlet around it, the giving wings to the charioteer, and the union of the two horses of the biga; it appears probable that some considerable time must have elapsed between the period when first the Philippi were imitated in the south of France and that when their modified copies were in circulation on the northern coast. As their weight is considerably less, it is evident they could never have been in circulation with the true Philippus, which is about 133 grains, while the heaviest British are only 120 grains. It is a well-known fact that among all nations, whether civilized or uncivilized, there is a strong tendency, for the sake of some small gain to the governing power, to reduce the weight of the coins, so that the earlier coins are almost invariably heavier than those of a later date, even though of the same denomination and current value.

Our Silver Penny, for example, of the present day weighs but $7\frac{1}{4}$ grains, though its original weight was 24 grains, as evidenced in our pennyweight; and the ancient Roman Solidus, of 70 grains of gold, is represented by the English Shilling and by the French Sou. Again, as I have already stated, while the proper weight of the Macedonian Stater or Philippus was 133 grains, it was in the later times of the British coinage reduced to 84 grains. There is also a strong desire not only to reduce but to adulterate the gold coins with less valuable metals, so that some of the later gold coins are often found with a strong coating of verdigris upon them.

Coincident with this diminution in weight, there is also a remarkable change in the types of the coins, each successive imitation becoming more and more remote from the original.

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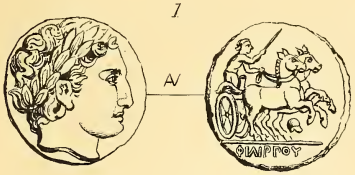

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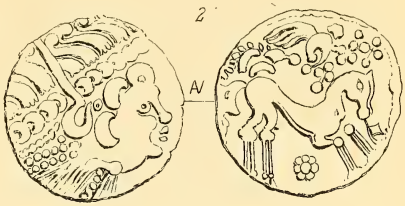

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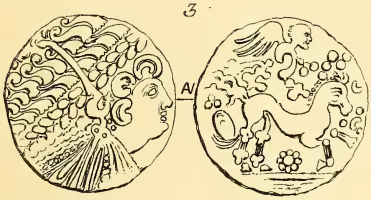

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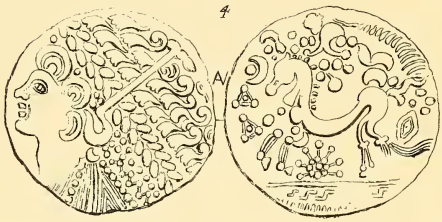

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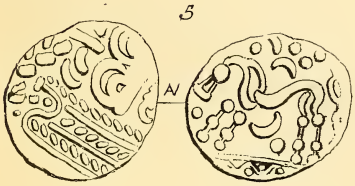

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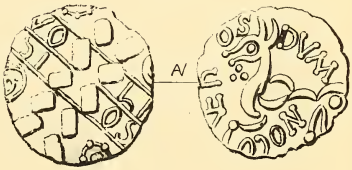

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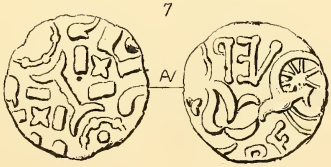

J & E. PULLEYN, LITH. LEEDS.

Among barbarous nations the laws which regulate the types of a coinage, consisting of successive copies of a given original, are very similar to those which, according to some of our best naturalists, govern the succession of types in the organic kingdoms of nature. As with plants or animals of any group or family, there are two tendencies to be traced in these successive copies—the one to retain the character of their ancestors, the other to vary from it. Again, there is a third principle or tendency of more importance, as far as results are concerned—that of the perpetuation of varieties when they are in any way advantageous. In nature those varieties appear to have become more or less persistent, which, in the "struggle for life," have presented advantages over the parent forms in their relation to external conditions. In the succession of types of British coins, the requirements which new types had to fulfil in order to become to a certain extent persistent, were, firstly, to present facility of imitation, and, secondly, symmetry of form. The great desire in all uncivilized people appears to be the selection of simple yet symmetrical forms of ornament, as also the saving of trouble.

From the diagrams placed on the walls it will be easy to see the divergence of successive types from the original Philippus; all the alterations, however, are in accordance with the principles I have just laid down. Compare No. 1 (the prototype) with Nos. 2, 3, 4, 5, in the plate, and we see the face, it is true, preserved, but the rest of the head has become conventionalized, or reduced to a system; the front hair has become converted into three open crescents; the hair at the back is represented by two parallel rows of nearly similar locks; the wreath is reduced into a double row of leaves, all of one size, extending across the coin; while the head is crossed at its centre by a straight band ending in a hook, where originally was the ear; and the neck has an ornamental covering of beaded and plain straight lines. On the reverse a greater

transformation has taken place; the horses of the chariot are distorted into something which undoubtedly was meant to be a horse, but which I feel great diffidence in presenting to a Yorkshire audience as a specimen of that noble animal. Some of the horses have the most fantastic shapes; that there were originally two is indicated by a double set of legs to one body: again, we see the head, legs, and tail all disjointed, and so distorted as to be only recognized as such by tracing them through a series of types. The same occurs with the head of Apollo. On some coins all recollection that a head was being represented appears to have been entirely absent; on others the face has completely disappeared, and a central rounded projection where it should be is all that remains. In others we see the head beginning to assume a cruciform appearance: further on it has been reduced to a regular cruciform pattern or flower, but with crescents in the angles of the cross to represent the locks of the front hair, and eventually no part of the head remains. On some coins the obverse is perfectly smooth and even.

There are two series of British coins,—one the inscribed and the other the uninscribed series; and although it is difficult to state the particular tribes to which they may have belonged, it is not difficult to see that the uninscribed series are, as a rule, of earlier date than those inscribed with the names of princes which belong to a more civilized era. By means of the conventionalized pattern previously referred to, the inscribed coins can be traced to their prototype, as for instance those of Tasciovanus, Eppillus, Dubnovellaunus, and Tinc (ommius), which are all evidently descendants from the same original, though widely differing in type. Now as we have the means of assigning a date to all these four princes, it will afford a clue to the probable date of the earlier coins. Tinc (ommius) and Eppillus appear to have been the sons of Commius, the Atrebatian mentioned by Cæsar in his *Com-*

mentaries; Dubnovellaunus is most probably the Damno Bellaunus of the Inscription of Augustus at Ancyra; and Tasciovanus was the father of Cunobeline, the Cymbeline of Shakspeare, and, therefore, a contemporary of Augustus. Speaking generally, therefore, the date of the British coins just enumerated may be taken as from 10 to 20 years before the Christian era; and if we consider what period would be necessary to allow of such a transformation of type from their prototype to their debased and degenerate state, both in execution and weight, from 120 grains to 84 grains, it is very evident some considerable period must have elapsed, as it is only fair to suppose that each successive type was struck in imitation of one already in circulation; and as there was also a debasement of the metal accompanying the diminution in weight of 30 per cent., I think that from 100 to 150 years is but a reasonable allowance for so complete a change of type and weight. We may, therefore, regard it as highly probable that there was a native coinage in some parts of Britain as early as B.C. 150, if not earlier.

The classification of British coins which I have adopted is that of assigning the different types, as far as practicable, to particular parts of the country in which they were probably struck. I have already assigned the date of about B.C. 150 for the commencement of the British coinage; but it is difficult to fix, with any degree of certainty, in what part of the country it actually commenced, though there is high probability that the knowledge of coining was first communicated to some parts of the south-eastern coast, as Kent, and gradually spread from thence, as a centre, and was adopted in different districts of Britain at different periods, varying in time in proportion to the distance of each from the centre, while the coinage of each district derived its character in a great degree from the peculiar modification of the prototype which was first introduced—the uninscribed series, in every

instance, being, doubtless, the earliest. One thing, however, is certain, that the currency of the British coins was for a time limited to the southern and eastern parts of Britain, though it afterwards extended as far northwards, along the eastern coast, as Yorkshire; and this is quite in accordance with the statements of our early historians. In Cæsar's time the coast of Britain, opposite to Gaul, had long been occupied by Belgic tribes; and the tribes of the interior are described as far more barbarous, and unacquainted with agriculture, though possessing flocks and herds. The Silures of South Wales, are expressly cited by Solinus* as refusing money and employing simply barter. Mela† also relates that the further the tribes were from the Continent the more ignorant were they of other riches than flocks and territory.

The immigrants from the Continent, who had driven back the earlier inhabitants into the interior, were no doubt considerably in advance of them in civilization, and were the first to introduce the art of coining. From the south-eastern parts of Kent the use of coins appears to have extended westward and northward, though we have no precise means of ascertaining the exact course it followed, or of the time it took to reach the more distant parts of the country. Following it westward along the coast, the counties of Sussex and Hants first claim our attention, and have some types peculiar to themselves. The silver coinage of Surrey and Sussex appears to have commenced long after the gold, and was formed upon a different model, probably also of Gaulish origin; but no uninscribed types in copper or brass can be assigned to these counties. Proceeding westward, we find that the prototype with the laureate head, after passing through various phases, took root in Dorsetshire, Wilts, and part of Hants; but whether the coins were struck by the Belgæ

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* Cap. xxxi., sec. alios xxii.

† Lib. iii., c. 6.

or Durotriges it is difficult to determine, though I think it must have been by the last tribe. The type had now arrived at that state of degradation which rendered it so easy to copy that there was no inducement for variation, and it therefore became persistent. It is remarkable that in this district both silver and brass coins were struck of the same module and of the same type as the gold, while in all the other parts of Britain coins made of the inferior metals are, as a rule, of smaller size and of different types. There is also another peculiarity attaching to this district, viz.—that it never had an inscribed coinage, though a little to the north, in Somersetshire, Gloucestershire, and part of Wilts, an inscribed currency was adopted, but at a later period, and derived from a different modification of the prototype, and comprising silver coins of a totally different module and character. Following the extension of the British coinage westward, beyond the territory of the Durotriges, it appears very doubtful whether the Damnonii, who occupied Devonshire and Cornwall, though not wholly unacquainted with the use of money, ever had a coinage of their own, as no purely British coins, as far as I am aware, have ever been found in Devonshire; and the only discovery of British coins in Cornwall, with which I am acquainted, is that of Karn Brê, which were of classes more commonly found in the southern counties to the east of Devonshire. In Buckinghamshire and Oxfordshire, the district occupied by the Catyeuchlani, various early types have been found, and the same has been the case in Herts, Beds, and Essex, the country of the Trinobantes. It is somewhat remarkable that no types can at present be assigned with certainty to the Midland counties, though it is most probable that some of the modifications of the original prototype were struck there, which connected the coinage of those counties with the barbarous descendants of the Philippus

in Norfolk and Yorkshire—the money of the Iceni and the Brigantes.

Having now arrived at the coins of this latter county, I may remark that the dominions of the Brigantes appear to have comprised Yorkshire, Lancashire, and other northern counties, and are described by Ptolemy as extending from sea to sea. Their most populous towns, whose sites can now be ascertained with any degree of certainty, are Caturactonium (Catterick Bridge), Isurium (Aldborough), Olicana (Ilkley), and Eboracum (York). Being situated so far north we find no mention of the Brigantes or their rulers in Roman history until A.D. 50 or 51. Coins belonging to Yorkshire have been discovered at Pickering, Almondbury, and Lightcliffe, near Halifax. Most of the coins of the Brigantes have been found in the southern parts of Yorkshire and in Lincolnshire, and have generally occurred to the number of three or four together, and sometimes associated with Roman coins.

From the localities where these coins have been found, there is little doubt of their having been struck by the Brigantes, though the fragmentary legends upon them afford no clue which will connect them with either the name of the tribe or of any of its cities or princes. The principal of these legends are the following :—VOLISIOS-DVMNO-CO-VEROS; DVMNTIGIP-SENO(?); HSVP(?)-SV; and VEP-CORF. With reference to the date of the Yorkshire coins there is, however, a certain amount of evidence to guide us. Their type is perhaps the rudest of all the copies from the prototype, and so barbarous an imitation of the Philippus as to place them amongst the latest of the British coins. The metal is also much deteriorated, pointing to a late date. In most instances also they have been found associated with Roman coins. In 1829, sixteen or eighteen were found at Almondbury (the Camboduńum of Leland), with 200 Roman family coins, some of which were in tolerable preservation, while the British coins

were sharp and unworn, from which it might be inferred they had not been in extensive circulation.

In 1827, a workman digging for gravel in the immediate vicinity of the old Roman road at Lightcliffe, near Halifax, came upon a fictile vase, apparently of Roman manufacture, which contained a number of coins, principally Roman denarii and family coins, but among them were four ancient British coins; three were of the well-known Yorkshire type, with the inscription, . VOLISIOS . in two lines across a wreath on the obverse, and the rudely-formed horse and DVMNO-CO-VEROS on the reverse. (*See Plate* Nos. 6, 7.) The fourth was a new variety, but evidently a direct descendant of the Macedonian Philippus, though only the wreath and the horse survive to prove its relationship, and the wheel-like form of the tail of the horse is all that is left to remind us of the chariot which was attached to the more artistic animals on the original. The imperial coins above alluded to included one of Caligula and Agrippina I., struck probably about A.D. 40. The hoard, therefore, could not have been deposited until after that period, and as we know that in the western parts of Britain the native coinage continued in circulation until after the accession of Claudius, it is very probable that the same occurred in the northern parts also; and as I am not aware of any Roman coins found with British of a later date than A.D. 40, it is very probable the coinage of the Brigantes ceased before A.D. 50. The date of its introduction, as I have already stated, cannot be determined; but from the similarity of the type occurring among them, it is evident the period over which they extended could not be long.

As far as I know, the ancient British coins are confined to the south-eastern portion of the territory of the Brigantes, and have not yet been found in Lancashire or the counties north of Yorkshire, and it is very probable that some of the uninscribed coins are the connecting links between the proper

coins of the Brigantes and those of the southern parts of Britain. They certainly do not appear to have derived their coinage from the Iceni. The type of their gold coins is quite different, and a silver currency, except of Roman coins, was apparently unknown, though the native coins of the Iceni, inhabiting the eastern district of Britain, are most abundant in that metal. I should therefore infer that the Brigantes derived their knowledge of the art of coining through the Coritani (or Coritavi), of whose coinage we know little or nothing at present. The gold coins of the Brigantes are rude in execution, debased as to metal, so as scarcely to deserve the name of gold, and in shape much dished or concave. The use of money at so early a period in this country may appear almost incredible to those who have been accustomed to regard the ancient Britons as in the lowest state of barbarism; but such persons, I suspect, have formed their estimate of the character of the Britons from the descriptions handed down to them of the tribes located in the interior rather than of those living along the seaboard of the island, who were mainly of Belgic origin, and to whom, for a long period, the use of money was confined, until it gradually spread into the neighbouring districts more inland. It is, however, an undoubted fact that the Britons were not only acquainted with the use of money, but were also accomplished workers in metals, and understood not only the art of coining, but also that of counterfeiting coins, which is a branch of the art indicative of a high state of civilization. I may observe, however, that the contemporary forgeries best known are of the inscribed series of gold coins of Addedomaros, Dubnovellaunus, and Cunobeline, and of silver coins of Tasciovanus. The forgeries of the uninscribed and most ancient coins are rare. The false gold coins are of copper and bronze, and covered all over with a thin plating of gold, and the silver coins have been fabricated by plating with

silver in the same manner. As to the method by which the coins were struck we have no certain means of judging, but I think it very probable that the dies in use amongst the Ancient Britons were similar to a very curious die lately discovered at Avranches, in Switzerland, and which had been intended for striking the obverse side of one of the Helvetian degenerate imitations of the Philippus. This die consists of a disc of bronze inlaid in a cylindrical block of iron, with a concave surface to produce the convexity of surface so common among the coins of this class, and also probably to prevent the rolling of the spherical pieces of heated metal from which the coins were struck. The execution of the devices upon the dies appears to me to have usually been produced by punches rather than with the graver, though it is probable both were used for the purpose on some occasions.

The influence of the intercourse with Rome upon the character of the coinage of the Britons is very perceptible, not only in the great improvement in the execution of thoroughly British types, but also in the introduction of purely classical devices by Roman artists, or probably native artists, who had had the benefit of Roman instruction, and who were first employed in the British mints about the period when the inscribed coins of Tinc (ommius) commenced, probably B.C. 54; and I have little doubt that in nearly every part of Britain where an inscribed coinage was current, one that was uninscribed had preceded it, and also that in most instances the use of this uninscribed currency preceded the Roman invasion. Finally, I may say, we have now evidence of a coinage belonging to the Ancient Britons extending over a period of two hundred years; and though much has of late been accomplished in arranging this important series, yet no doubt many types still remain undescribed, which the researches of those living in different parts of the country will, it is hoped, eventually supply.

ON THE OCCURRENCE OF A LEAD CELT IN LINCOLNSHIRE; WITH REMARKS ON CELTS GENERALLY. BY HENRY DENNY, A.L.S., ETC.

Of the various implements which have come down to us belonging to people of remote ages, none are so extensively distributed as those known under the general name of *Celts*, and perhaps none possess greater interest from the obscurity which exists as to their original use or uses; for, though all are denominated celts, they are not all precisely alike. It is also a fact, not a little remarkable, that the rude stone implements of all uncivilized nations have a nearly uniform type or pattern, and are made of such materials as were most probably the nearest at hand; hence we find the most primitive made of serpentine, jade, basalt, sienite, coarse grit, clay-slate, granular porphyry, andernach trap, red iron-stone, horn-stone, and flint. As the nations became more advanced in civilization, we find implements made for the same purpose of metals, and almost invariably of copper and bronze; many of these exhibit great proficiency, not only in the art of casting, but also of design and finish.

The latter, however, I believe, have never been found except in the various countries of Europe, though Worsaae tells us that the ancient Egyptians and Mexicans possessed battle-axes of bronze and copper. But who these early people in Europe were, or what the probable date of their original introduction, is still a subject of controversy. For, as Mr. Syer Cuming has well remarked, the term celt, used as it is in such an indefinite way for nearly all bronze and stone implements, has no relation whatever to the people bearing that name, but is derived from an old Latin word, *celtis*, supposed to mean a graving-tool* or chisel; and it is remarkable, at all events, that the word is thus used in

* See Forcellini's *Lexicon* under the word *Celtis*.

the Vulgate translation of Job xix. 24—*Celte sculpantur in silice,* and translated in our version, "Graven with an iron pen in the rock;" and it is very probable that implements of flint or stone were used in the very earliest ages for various purposes, as we find Joshua made knives of stone to circumcise the children of Israel (Joshua v. 2). There is, however, a presumption that the period of the manufacture of bronze implements in Europe is at least a thousand years before the Christian era, as Worsaae says that there are geological reasons for believing that the bronze period must have prevailed in Denmark five or six hundred years before the birth of Christ; and as he supposes that the bronze was obtained from England, it is fair to infer they were of higher antiquity in Britain than in the north of Europe. For, although the stone and bronze periods may have been coeval in different and distant countries, the first attempt at the construction of such objects in each would, doubtless, be to form them of stone, and even when the use of metal was partially discovered, the operation at first would be slow, and, like that of the Indian of the present day, by beating out a lump of copper or other metal; which mode would continue for a long period before the art of casting or ornamentation was arrived at, and probably centuries would elapse unless the above manufacture was introduced by a more advanced or civilized people.

That they have been native manufactures in most instances is, I think, evident; for not only have large numbers been found together in one spot, but also the moulds from which they were cast. Now, as copper or bronze are the materials or metals of which they are usually made, a question has been raised—From whence have all these early people obtained their metal? I have already given Worsaae's opinion that it was Britain; and it is most probable that Cornwall has been the locality, as we know that a very extensive

trade was carried on by the Phœnicians with the Cassiterides, or Tin-islands, centuries before the Christian era. While, however, the former metals were in general use for various objects, lead, also a Cornish metal, does not appear to have been in request for the manufacture of celts, as I am not aware of any record of a celt having been found composed of that metal alone, which from its softness certainly does not appear well adapted for the purposes to which such implements are generally supposed to have been applied.

A specimen, however, of the ordinary socketed celt, with a loop, and made of lead, has been for many years in the Museum of the Leeds Philosophical and Literary Society, obtained from Anwick, near New Sleaford, in Lincolnshire. It measures four inches in length, and nearly a quarter of an inch in thickness at the base, and weighs a little exceeding three-quarters of a pound. The lead appears much altered in colour; the surface, acted upon by age, has what a numismatist would call a coating of patina upon it. Placed as this specimen had so long been with several other celts of the usual material, it had not attracted particular attention until recently, when, upon showing it to the Rev. William Greenwell, of Durham, that gentleman immediately recognized the novelty of the metal for implements of that description, and expressed a desire to know something of its history. As there was every indication of age and genuineness in the specimen, it became important to inquire what were the precise circumstances connected with its discovery. Much must depend not only upon the locality in which it occurred, but also the character of the parties from whom it was originally obtained, which alone could remove any suspicion which might be entertained of its being a mere modern fabrication, like some of the flint implements from Bridlington and Scarborough, the handiwork of the notorious Flint Jack. I therefore applied to the gentleman by whom it was presented

to the Museum for such information as he could still communicate, and received the following reply:—

"33, Saint James's Street,
"*Leeds*, 18*th June*, 1865.

"Dear Sir,—The lead celt referred to in your letter was given to me by Mr. Faulkner, of Anwick, near Sleaford, in Lincolnshire, farmer, about 22 years ago. I first saw it lying on his chimney-piece, when I asked him for it and its history. He informed me that one of his labourers found it while hoeing in a field on the farm;—that he had previously carted away a hillock in the field and spread it over the land, and he supposed this thing had been carted out of the hillock on to the land, and afterwards found by the labourer, who struck it with the hoe while hoeing, I think he said, turnips. When I obtained it it was so thickly incrustated that the metal could not be seen, but my domestics cleaned and spoiled it. What Mr. Faulkner meant by 'carting away a hillock,' was the removal of a hill in the field and spreading the earth thereof on the field to level it for cultivation.

"I placed considerable value upon the celt, as I had not any doubt of its being a genuine celt, and it seemed to me to upset the theory that celts were used as weapons or axes, and would ultimately lead to an inquiry as to whether celts were not insignia only amongst the persons who held them.

"Anwick is in a very ancient district, on the high ground at the edge or brink of the Fens or ancient sea of Lincolnshire, just in the place where you might expect to find things of the highest antiquity.

"Kynie, the adjoining parish, has produced many antiquities.

"Sleaford and the surrounding country is exceedingly rich in geological remains. You have in the Museum some elephant's teeth found there in the gravel; the bones of the same animal were lying in the same spot as the teeth, some of the bones being so large that their diameter was almost as much as the width of the workman's spade when he cut them.

"I am, dear Sir, yours faithfully,

"JNO. GREENE, Solicitor.

"Henry Denny, Esq.,
"Curator, Philosophical Hall, Leeds."

With reference to this letter, I will only remark that the hillock to which Mr. Faulkner alludes as having been levelled in his field, may have been a barrow, and, if so, the occurrence of the celt is at once accounted for; as Mr. Bateman, in his ten years' diggings, records three instances in which

bronze spear heads and celts were found in barrows, and, I believe, in Derbyshire. In the 10th volume of the *Archæological Institute*, p. 691, occurs a notice by Mr. Fowler, of Winteringham, in Lincolnshire, that on the 17th December, 1852, a ploughman turned up in a field near Winteringham seventeen bronze celts, with three other metallic fragments, and that his attention was drawn to them by the ploughshare sticking amongst the celts, which were all candied together. The seams left by the mould in casting were imperfectly trimmed—a circumstance which, connected with the discovery of metallic fragments with the celts, might suggest that this place of deposit was the site where a foundry for such objects had formerly been situated; and he also states that a chain of barrows extends from the Humber into the interior of the country.

The last fact partially corroborates my supposition of the hillock in Mr. Faulkner's field having been a barrow; and the probability of a foundry having been formerly in the neighbourhood has also a bearing with the celt under consideration, to which I shall presently allude. The great interest, however, of the example centres in the material of which it is made; from which circumstance Mr. Syer Cuming (no mean authority) says, as far as he knows, it may be pronounced *unique*. This fact has induced me to bring before the Geological and Polytechnic Society a short notice of so singularly rare a specimen, accidentally rescued from destruction. Affording, as it does, another instance that from the *débris* of a British or Saxon barrow—the solitary grave of a Red Indian—the mounds of Nineveh—or the buried cities of Mexico—relics may be obtained which tell us, in a language not to be misunderstood, the great progress these early people had made in different branches of art; as also the interesting fact, that the same rude wants were provided for by the same simple means in the construction of

implements of one common type by widely-separate races of men, and appear to furnish indirect evidence of the common origin of mankind. Dr. O'Callaghan, in a paper read before this Society at Bradford, arrived at a similar conclusion, from the consideration of the universal practice of forming the cromlech as a place of sepulture by uncivilized people in every part of the world, and in all ages.

Finally, in reply to the generally received opinion that celts, in the ordinary acceptation of the term, have been used as weapons of defence, I venture to remark that it is very probable, as we find them of different forms. The common socketed celt or pot celt, the same with the loop, the palstave, the lance head, &c.* Their uses may have been as different as their forms. That while some have undoubtedly been for spear heads, or offensive and defensive weapons, others appear as ill adapted for that purpose.

Mr. Syer Cuming, who has given much attention to these objects, believes that the socketed specimens have been used as buts or ferrules for the shafts of spears or lances, by which they might be fixed in the ground, or even used at times for offensive weapons; just as the Romans used the *spiculi* of their *hastæ*. As evidence of this connected use, Mr. Cuming cites their frequent discovery along with spear heads; that of a stone found in the Isle of Anglesea, upon which were cut moulds for casting both the spear blade and the celt; and also that iron ferrules, of analogous shape and structure, are frequently seen upon the spear shafts of warriors of both Eastern and Western Africa.

The occurrence of celts in burial mounds, or simple graves, is quite in accordance with their character, either as weapons of defence or insignia of office, as we find it a universal practice among uncivilized nations to inter with their dead

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* See Wilde's Catalogue of the Antiquities of the Royal Irish Academy.

warlike implements and other objects, whether of ornament or for domestic purposes, which have been valued by the deceased, or presumed to be required in the world of spirits by their original or former owners. Hence we find necklaces, amulets, fibula, caskets, drinking cups, needles, celts, spears, knives, bosses of shields, horse harness, portions of war chariots, fragments of the funeral repast, trophies of the chase, and various other relics of unknown use.

A most remarkable instance of this kind has been discovered in New Zealand during the past year. A man in the employ of Mr. Davidson Fyffe, of Kai Koras, near Wellington, while digging for the foundation of a house on the side of a small mound, suddenly came upon a human skeleton, doubtless that of a Maori, which appears to have been buried in a sitting posture, with the arms extended towards the mouth, near which was the entire egg of a Moa, and between the legs numerous tools made of jade—including a spear, an axe, and several other implements. Here, as is most probable, the egg was intended as food for the deceased, as it is barely possible an empty shell would have been so deposited, unless in some way transformed into a drinking vessel or personal ornament, which in this instance did not appear to have been the case. Under the former supposition it affords indubitable evidence that the Maori and Moa were contemporary inhabitants of New Zealand, and that the latter had probably been used as food by the former.

Again, we know that even among people so highly civilized as the ancient Egyptians, they commonly interred with the dead small emblematical representations of the different divinities who were supposed to have influence over the eternal destinies of the deceased; and various other objects, even dolls, personal ornaments, corn, bulbous roots, &c.

Supposing, however, that evidence, apparently the most conclusive, may eventually be adduced of their having all been

intended for weapons of warfare, but that the specimen before us, from its material, appears still to refute such a supposition, this refutation may be more imaginary than real; as my friend, Dr. O'Callaghan, of Leamington, has suggested a probable reason for the use of so unusual a metal, which is, that it may have been a *trial celt of lead* run into the matrix before the more valuable metal bronze was hazarded for the final operation of casting. To which I may add the singular coincidence, that the Rev. W. C. Lucas, F.S.A., well known for his extensive explorations of barrows in Great Britain and the Channel Islands, suggested precisely the same solution of this difficult problem, without being aware that a similar opinion had been already expressed. And it is somewhat remarkable, and may probably bear on this subject, that in draining some land at Winterton, specimens of Roman pottery were discovered, in one of which vessels thirteen rudely-formed disks of lead were found, the use of which was unknown. Might they not have been samples of lead preserved for casting celts or objects of a similar kind?

Whatever diversity of opinion, however, may exist as to the uses of metal celts, that as regards those of stone is now as clearly established, by collateral evidence, as could be required, by one of the most important Anthropologico-Archæological discoveries of modern times. In the month of January, 1863, a magnificent skull of the Bos primigenius was found beneath four feet of peat, near the village of Reche, in Burwell Fen, Cambridgeshire, with the frontal bone on the upper margin of the orbits broken in, and the remains of a flint celt in the orifice. The celt had penetrated the skull to a depth of $2\frac{3}{4}$ inches, and broken off against the inner surface of the base of the skull, the fragment measuring three inches in length. Professor C. Babington, of Cambridge, to whom I am indebted for a printed notice of this interesting discovery, says "that probably the celt was

fixed in a heavy handle so as to increase the weight of the blow, and so placed as to resemble an adze rather than axe;" the fracture in the skull being just that which we see in those of oxen slaughtered with a pole-axe at the present day. The discovery of the skull with the celt *in situ* is a most remarkable corroboration of the origin of similar fractures in skulls of the megaceros, ox, and swine, which were found several years since in Lough Gur, near Limerick,* and created no little diversity of opinion at the period. Had a solitary specimen only occurred, it might have afforded a plausible reason for conjecture as to its being merely the result of accident. But when several examples were discovered, with precisely the same fracture in the frontal bone, it appeared to me that but one cause ought to have been assigned, and the one most natural to suggest itself was that the animals had been slaughtered or received their death-blow from the hands of man.

This specimen, therefore, not only illustrates one use of the stone implements of that character most conclusively, but also a still more important fact, hitherto considered very doubtful by some of the most eminent geologists of the day. It proves that man has most certainly been coeval with this gigantic ruminant, which was itself a contemporary of the mammoth, rhinoceros, and other extinct mammalia of the post pliocene period; and therefore, in all probability, man has also coexisted with the extinct pachydermata, which consequently carries the advent of the human family back to an almost incalculably remote antiquity, and, to use the words of a modern writer—"The conclusion of such discoveries is that ages ago, in the period of the extinct mam-

* Skulls of the ox and swine, with the fractured frontal bone, from the above locality, have been many years in the Museum of the Leeds Philosophical and Literary Society; as also the skull of an ox with a similar fracture, found with other bones in a Roman well near Gilsland.

moth and fossil bear, perhaps before the channel separated France from England, a race of barbarous human beings lived upon the soil of Europe, capable of fabricating rude implements of flint. The mind is lost in astonishment in looking back at such a vast antiquity of human beings, a tribe of men in existence thousands of years before any received dates of creation; savages who hunted with their flint-headed arrows the gigantic elk of Ireland and the buffalo of Germany, or who fled from the savage tiger of France, or who trapped the clumsy mammoth of Northern Europe. Who were they? we ask ourselves in wonder. Was there with man, as with other forms of animal life, a long and gradual progression from the lowest condition to a higher, till at length the world was made ready for a more developed human being, and the Creator placed the first of the present family of man upon the earth? Were those European barbarians of the drift period a primæval race destroyed before the creation of our own race; and lower and more barbarian than the lowest of the present inhabitants of the world? Or, as seems more probable, were these mysterious beings, the hunters of the mammoth and the aurochs, the earliest progenitors of our own family, the childish fathers of the human race?"

At the conclusion of the Paper, Mr. Evans, F.R.S., humorously alluded to the difference between celt, the implement, and Celt, the race known by that name. The two names being similar, produced, he argued, a confusion of ideas, and as the Saxons pronounced the "C" hard, he suggested that it would be better to vary the pronunciation by pronouncing the implement kelt, and the race Celt. Without vouching for the accuracy of what he was about to propound, he thought it was worthy the consideration of a Society like this to ascertain whether celts

found in the various places might, after all, not be actual implements, but placed on the grave, as swords and implements of war were in former times in Germany and other countries placed on the graves of many persons. Instead of burying the actual arms used by the persons so buried, it had been the custom to place with the corpse imitations of the kind of weapon used, and thus there were miniature swords and other arms; and it was a matter for consideration whether the unique celt, to which their attention had been drawn, might not be an imitation after all, though genuine as to its antiquity.

The Rev. Scott F. Surtees, Rector of Sprotburgh, was the contributor of the next Paper, which, in that gentleman's absence, was kindly read by Dr. Scholfield, Honorary Local Secretary. It was as follows :—

ON LOCAL NOMENCLATURE, AS DERIVED FROM SAXON SETTLEMENTS IN SOUTH YORKSHIRE.

A local meeting of this sort expects some local information. There are few parts of England, we believe, where subjects of greater interest could be found. These eastern coasts of ours were of easy access to the northern races, who yearly sailed from their fiords in search of adventure and plunder. The Humber and its tributaries, up which their narrow ships could run far into the inland country, we find were constantly visited, and *Dune-muth,* or mouth of the Don or Dun, is often mentioned as their resort; it certainly was in the later years of the Heptarchy. Are there any traces of earlier visits to these parts? Was there, or was there not, a Saxon settlement north of the Humber when the Saxons first settled on these shores? The names of places in this neighbourhood answer the question for us. We

have a collection of names clearly indicating a location of a Saxon or Scandinavian race—names not selected at random, but those familiar to every student of Norse history—household words in their Sagas and songs.

First, we have a residence marked out of a Saxon king amongst us, and near by of the blood royal, and also the site of the district court established by the older and first Saxon settlers; secondly, we find traces of the newer or later Northmen, who fought and harried, and then settled in these districts in the later centuries before the Conquest.

Now, as to the first point, that here was a royal residence: Coninges-burh—Coning, *king-es of burh*, borough, or "King's borough,"—"Conisbro" still retaining its ancient orthography, although the ferry has it altered into *King's ferry*. Then we have the town of the "Blood Royal"—Edling-ton—ðeling, or *Etheling*, being Saxon for royal or noble (Þ in the Saxon alphabet, bear in mind, standing for *th*).

We would here mention how invariably the Saxon race shortened their words and elided the middle syllable. Two examples will be familiar to you all—*Woden-es-day, or the day of Woden*, into "Wednesday;" *St. Botolph's town* into "Boston."

Now, note the name "Mexbrough"—*Mearcs-brough*, how it tells of the ancient race and their customs. The Anglo-Saxon settlers called all lands held in common "Mearc" or "March." Kemble says, "Mearcs-burgh was the mount or hill where they held their courts, and they themselves, *i.e.*, the freemen, were called Mearcs-men." (How the old title "Lords of the Marches," in our history of border warfare, perpetuates the name!) Mexbrough, no doubt, was one of such sites, or places of assembly, held in common by the mearcs-men or march-men of this district.

But, again, other bands of Northmen enslaved, if they did

not trample out, the Anglo-Saxon settlements in this part of England. So complete was the conquest that they changed the very laws of the land, and we find in that interesting book —Laing's *Chronicles of the Kings of Norway*, "That for three hundred years from about 787 A.D., the laws and customs of the Northmen superseded in large districts, such as East Anglia, Mercia, and Northumbria, the ancient laws of this realm." In our ignorance we choose to call them all by the name of Danes, but in reality these districts were possessed by different peoples. Now it was a Dane—then a Norwegian, or, it may be, a "Viking" from Sweden, who, sometimes acting in alliance and sometimes as foes, occupied and ruled in turn these lands.

It is strange that students of English history have so missed this point. Two quotations I will make to prove this from the old Chronicles of Norway—"Athelstan sent a message to Eric (Hakon's brother), who went out on an expedition plundering all the north part, that he should hold North Humber-land as a fief from him, and defend it against *Danes* and other Vikings. Eric resided at York, where it was said Lodbrook's son had formerly been, and Danes and Northmen had often plundered."

Again—"The Danes had spread themselves so widely over England that Ethelred had gone south to Valland. In the autumn King Olaf came to England. Ethelred came back to England and sent an invitation to all who would to enter into his pay; amongst others King Olaf, with a great troop of Northmen, came." King Olaf attacks the *Danes* in London at *Sudrivick*—Southwark. The old Norwegian Saga has as follows:—

"Brave Olaf will his throne defend,
King Ethelred has found a friend;
In bloody fight
Maintain his right,
Win back his land
With blood-red hand."

In 1016, "King Olaf was still in England and came into these parts, as we read Ethelred's sons came to Olaf and promised him North Humber-land (that is, the land north of the Humber) if they drove the Danes out of England. Olaf comes to North Humber-land to Furo-vald, and in a battle with the townspeople and merchants gains great booty and victory."

In short, as the Saga informs us, thus corroborating the Chronicles, "he appears to have sailed about defeating the Danes and plundering the people—

> "Money, if money could be got;
> Goods, cattle, household gear, if not."

Now these later Northmen called their court or place of assembly "Thing," or *Mōre Thing*, and themselves not *Mearcs-men* but "Thing-men." Now note how satisfactorily we trace their occupation of this district. Laughton-le-Morthen, law town, where they met to make their laws. *Mōre Thing*, the place of meeting. The Normans, into whose hands these districts passed, in giving the name of *Law-toun*, added the *le*, and gave also the word *Mor-Thing*, used by the Northmen to describe their place of assemblage in their own country, and so we arrive at the name of Laughton-en-le-Morthen, and also almost to a certainty of the rule and location of a race different from the older Saxon occupants of these lands.*

Now the principal places where "Things" were held in Norway, were one at Moere or Mōre, and one at Lade, in Drontheim district, where they transacted the business of the people. At Upsal also there is a mound called the "Thing's Mound," flat at the top and steep slopes for the people to sit upon. The "Lagman" or "Lawman" presided at these

* In Inq. 13 Ed. 1st, by John Kirkby, Treasurer of Fees in county of York, the name of Laughton is correctly spelt; under the head of "Morething,"—"John de Morething holds of John Count Warren."—See *Dodsworth MSS.*

meetings. The mound at Laughton-en-le-Morthen still exists, similar to the one at Mōre in Norway and Upsal in Sweden. (See Laing's *Chronicles of Norway.*)

There are other names, not fanciful or far-fetched, bearing witness to the earlier settlement of the Saxons here. Some of them we have given in a work called *Waifs and Strays of North Humber History.* There is for instance—

Cadeby—Keadby; and Ceadbad is a descendant of Woden.

There is *Hunger-hill,* and Hunger is a chieftain noted in the ancient Sagas.

There is *Cusworth,* or *Gewisworth;* and Gewis is a contemporary and relative of Hengest.

There is at Sprotburgh, *Hengest-rein,* and adjoining it *King's-grave Field,* witnessing in a most striking manner to the spot where the great chieftain met his death, which we are told by *all* the old historians was near Conisbrough, on the banks of the Dun.

There is *Beorn-brough,* or *Barnbrough;* Beorn being a son of Bœldeg, son of Woden.

There is *Harlington,* a hamlet near Barnbrough; Harling being another famous worthy mentioned in the *Traveller's Song.*

There is the name of the residence of Billing—*Billingham,* or *Billham;* Billing being the noble founder of the royal race of Saxons.

There is the town of *Icel—Hickel-ton.* Icel, a descendant of Woden and Wœrmund.

There is *Wœurmunds-worth*—Warmsworth, or the land of Wœurmund, he, too, being a descendant of Woden and contemporary of Hengest.

There is *Hengest-thorpe,* or Hexthorpe—as contracted *thorp* or *dorp* being Saxon for village.

There is *Wada-worth,* or Wadworth; Wada being the

father of Weland, "the smith;" the ancestor in nomenclature of the numerous progeny of Smiths who are not unknown in this our England of the present day.

There is *Branton*, or the town of Brand; he being another son of Bœldeg, and grandson of Woden.

Surely all these different names of Saxon chieftains and heroes, in so many ways connected with Hengest, point out to us not only that it was here that that great conqueror of Britain fought his last fight and fell, but that here himself and followers had their location and their home, and that *Thun-castle*, or *Dun-castle* (*th*=Þ) which all historians mention as the name of Vortigern's grant, was situate in this district, on the banks of this old Dun.

There are many other points of interest which might be mentioned, but it would only encumber our subject. We have finished; and we trust that we may have interested some of you in the traditions and localities of your own immediate neighbourhood, and that others may be led to make further researches in that earliest of all districts mentioned in ancient English story, the old *Campodunum*, or *Dona-felda*, or *Plain of the Don*, which has witnessed such changing scenes, and been alike the home and battle-field of so many and such various people and nations, and which has known as masters the Briton and the Roman, the Pict and the Saxon, the Dane and the Norseman, and, finally, the Norman, conquerors of them all.

Mr. Denny, in the absence of the writer, John James, Esq., of Sheffield, read the following Paper on—

THE LITTLE BRITISH KINGDOM OF ELMET.

When the Roman legions had been withdrawn from our shores, and nearly the whole country lay at the mercy of the Anglo-Saxons, there existed in the heart of the West-Riding of Yorkshire a little state called Elmet, which maintained for nearly two hundred years its independence. It was probably enclosed on all sides by the kingdom of Deira, which included the whole of the other parts of Yorkshire.

This *Regiuncula* of Elmet, as it has been called, possesses for many reasons great interest both to the antiquary and general inquirer.

1st. Because it probably remained, in regard to inhabitants, religion, and manners, much the same from the time when the Romans quitted this country until the year 616.

2nd. Because in this interval it stood like an oasis hemmed in by the desert of Saxon paganism. From the time that Christianity was introduced into Yorkshire, probably in the latter part of the second century, its pure light, it may be believed, never afterwards became extinguished, nor the literature, arts, and civilization of Rome quite lost in this territory of Elmet, though the gross darkness of heathenism pervaded for a long period the Saxon rule in England.

3rd. Because Leeds, now the capital of the West-Riding, was most likely also the capital of the kingdom of Elmet.

The history of this interesting little state is involved in deep obscurity, for very few ancient notices have descended to us respecting it.

Lappenberg, in his *History of England under the Saxon Kings* (translated by Mr. Thorpe), states that Herevic, grandson of Ælla, King of Northumbria, was poisoned in Elmet

some time before the year 616, and that about the same year his uncle Edwin, also King of Northumbria (which included the province of Deira), as one of his earliest deeds on ascending the throne, conquered about the year 616 the little British territory of Elmet, which had existed as an independent state. We are also informed that at this time Cereticus held the sovereignty of Elmet. Within a few years after this conquest, Edwin was converted to the Christian faith by Paulinus, who afterwards preached at Dewsbury and throughout these parts.

The country of Loidis, which by Thoresby was assumed to be the same as the district of Elmet, is mentioned by the venerable Bede, and also the "Wood of Elmet," as hereafter more fully stated.

But the most curious notice of Elmet is contained in the fragment of an ancient MS. inserted in Camden's *Britannia*, and containing a list of the Saxon divisions of England during the time of the Heptarchy, when England was not divided into counties, but only into several partitions with their number of hides. In this list the number of hides possessed in Elmet is set down, but it is far from certain whether these were all that were included in the former district of Elmet, or merely represented a later "partition" carved out of it. At this point the inquiry naturally arises —What, then, were the extent and bounds of the ancient kingdom of Elmet? The subjoined remarks are offered as aids in answering this inquiry:—As to its extent, from the ancient MS. inserted in Camden's *Britannia*, we find that Elmed Setna (that is, the inhabitants of Elmet) possessed or occupied 600 hides of land, and Wight-Gora (which it is presumed stands for the Isle of Wight) is also set down in the same MS. as consisting of the like number of hides; so that, taking the hides to contain the same measure of land in both places, we obtained from the known area of the Isle of

Wight 86,800 acres, or about 136 square miles. But it is very probable that the district of Elmet contained much more.

Bishop Kennet, in his *Parochial Antiquities*, observes that the word "hide" was originally taken for a house, and what Bede calls *familias*—that is, as much land as would maintain a family; for his Saxon interpreter, King Alfred, calls the owner a Hydelander. The quantity of a hide was never expressly determined—sometimes it contained 100 acres, sometimes eight virgates (192 acres). The truth seems to be, hide, knights' fee, and yardland differed in different places.

Now it is quite certain that in the Saxon times the hide contained more land in the sterile or uncultivated lands of the north of England than in the more fruitful districts of the south. For instance, it appears from Domesday Survey for some parts of Lancashire, six carucates or 600 acres made a hide of land, but in other counties the hide and carucate were mostly the same. The district of Elmet, it is supposed, took its name from abounding in elm trees. As will hereafter appear, it is conjectured that it included within its bounds at least the valleys of the Wharfe and Aire, and probably also that of the Calder. Every one traversing these valleys cannot but be struck with the large remnants of the forests which completely covered their slopes in the days of our Saxon forefathers. In Otley manor, there were at the time of the Domesday Survey—Coppice Wood, nine miles in length and nine miles in breadth; the Great Wood of Farnley, near Leeds; the Bishop's Wood, near Sherburn, and numerous others, are vestiges of the immense forests which spread over the face of Elmet, and gave security and independence to its inhabitants. It is evident, therefore, from the existence of these immense forests, and the vast tracts of moorland between the valleys, that a very extensive

tract of country would be required to support 600 families, supposed to constitute the population of Elmet: for a family in Saxon times had often a large number of dependents. From all these considerations it will perhaps be a moderate estimate to allot to the kingdom of Elmet about 400 square miles, or say 25 miles long and 16 miles broad. In corroboration of this surmise Bede states that the island of Ely (which is 24 miles in length and 14 miles in breadth) contained in his time 600 families, hides or households, and it was unquestionably then a more fertile spot than the country around Leeds.

As to its bounds, Thoresby, in his *Ducatus*, observes: "The territory about Leeds called Elmet, or the *Regio Loidis*, which seems in those ages [Saxon] to have been of equal extent." Undoubtedly, the *Sylva Elmetiæ* of Bede, and adds that he durst not venture upon defining the boundaries of this *Regiuncula* of Elmet. What Thoresby durst not venture upon it may appear rash to attempt. The following hints are, however, with all diffidence, offered towards solving this difficulty. Thoresby himself, in the *Ducatus* (page 245, second edition), remarks:—"I take Shireburn to be the utmost limits, at least in this topography, of the ancient *Elmed Setna*, or the inhabitants of Elmet, as I take the word to signify." Here, then, we have the authority of Thoresby for assuming Sherburn to be on the eastern boundary of Elmet; but there are also other reasons for this opinion.

In many ancient writings Sherburn is described as "Sherburn in Elmet;" and Old Lambarde, in his Dictionary, published in 1577, says the "Territory or Hundredth about Shyrburne, in York, is called Elmete." Again, the very title—"Shireburn"—denotes the boundary of a shire or district. Towards the north it is not unlikely that the river Wharfe formed the boundary. Nowhere can the monastery

of the most Reverend Abbot and Priest, Thrydwulf, mentioned by Bede to stand in the "Wood of Elmet," be placed more appropriately than at Tadcaster, for there or thereabouts a monastery existed in the Saxon times, the only one in that part of the country which can be considered as included in the territory of Elmet. That this territory could not extend to the north further at the most than Tadcaster, may be concluded from the circumstance of York being the capital of Deira from the time of its subjugation by the Saxons, and that the district between the Wharfe and the city incontestably belonged to it. It is clear that the country contiguous to Tadcaster on the south belonged to Elmet, because Berwick-in-Elmet lies in that quarter. And here, most likely, from the remains still seen, stood the royal villa or residence of the later Kings of Northumbria, mentioned by Bede as lying in "the country of *Loidis.*" As to the boundaries of Elmet on the west, there seems but little material to form even a probable opinion.

Lappenberg thinks that the district called *Cumbria* extended into the later kingdom of Northumbria, and that "the little state of Elmet" belonged to it. This conjecture, for it is only one, does not seem very plausible, for the voice of history is plain that Elmet was an independent state under its own king. Besides, Lappenberg's theory would require Craven to have been included in Cumbria, and the evidence is strong that it belonged to Deira. It is, however, not improbable that the state of Elmet extended on the west to the confines of the Deanery of Craven (about 25 miles from Sherburn), where there seems to have existed from a remote period a strong line of demarcation. On the south there are no means of forming a judgment as to the situation of the boundary line.

Dr. Whitaker, by including the parish of Halifax under the title of his great work, apparently thought that it formed

part of the southern boundary of the district, to which he gave the name of *Loidis et Elmete.* Indeed, his work includes very much the same country as that ascribed in this Paper to Elmet. Taking Sherburn as the east point, Bingley as the west, the breadth required (16 miles) would include the lower portions of the valleys of the Wharfe, Aire, and Calder. The town of Leeds either gave the name to the *country of Loidis,* mentioned by Bede, or took its name from it as its capital.

Let us now consider for a few moments the question of the state of Leeds prior to the Conquest. Thoresby believes that *Caer Loid Coit,* one of the twenty-eight British cities enumerated by Nennius, was Leeds, *not Lincoln,* as many have supposed, and adduced, among other good reasons, the great authority of Dean Gale for this opinion. Dr. Whitaker, that prince of topographers, in a note to the passage in Thoresby, says:—"On a cooler consideration than our author's partiality to the subject would allow him to bestow on it, I cannot but think that Leeds has a fairer claim to be the *Caer Loid Coit* of Nennius than any other place." That Leeds was a very important place in the Saxon times is satisfactorily proved by Domesday Survey; for seven Thanes held it of King Edward the Confessor for seven manors, valued at the large sum of £6. Besides, there were there a church, a priest, and a mill, several classes of occupiers representing a considerable population for the age, and many other indications of a place of importance; in fact, the chief town of the district. Singularly enough, the Conqueror, though he devastated the neighbourhood, spared Leeds, and hence its rapid growth soon after, whereby it eventually obtained a great charter from the Paganels, its lords, and became large and prosperous.

The concluding Paper, contributed by Henry Clifton Sorby, Esq., F.R.S., of Sheffield, was

ON IMPRESSED LIMESTONE PEBBLES, AS ILLUSTRATING A NEW PRINCIPLE IN CHEMICAL GEOLOGY.

In certain conglomerates, consisting chiefly of pebbles of limestone, met with in various places on the Continent, and notably in the so-called *Nogelflue* in Switzerland, a very curious and interesting phenomenon has been observed: one pebble penetrates into another, sometimes to such an extent that it nearly passes through it, without there being any apparent fracture. Usually, however, the impressions vary in depth, up to half-an-inch or more, and into them another pebble accurately fits; and when it is removed a hollow is left, as if it had been pressed into soft clay. Much attention has been paid to this phenomenon in Germany and France, and various theories have been propounded, none of which in my opinion are satisfactory; but it has attracted so little attention in our own country, that I have met with very few of my countrymen who ever heard of the subject. On studying the German and French literature related to this question, references to which may be found in a Paper of mine published in Germany,* I soon became convinced that the facts could not be explained in a satisfactory manner on any known chemical or mechanical principles, and I therefore was induced to investigate the question with the view to ascertain whether it would lead to some new physical principle. One thing led to another, until I was led into a wide and almost unexplored branch of research, which in the course of time enabled me to establish the direct correlation of mechanical and chemical forces;† in other terms, I

* *Neues Jahrbuch für Mineralogie*, 1863, 801.

† See Bakerian Lecture. *Proceedings of Royal Society*, vol. xii., p. 538.

proved that in the same manner that we may obtain mechanical force by means of chemical changes, so we may modify or produce chemical changes by mechanical pressure.

All previous writers had attempted to explain the impressions in the pebbles either by mere mechanical or simple chemical action, localized by mechanical conditions. The facts point so strongly to both agencies, that it is easy to understand why the opinions ever varied between the two extremes; and it now appears to me astonishing that no one was led at an earlier period to suggest a correlated action of both. At the same time we must admit that a large part of those who have studied the question, did so before the doctrines of the correlation and conservation of force were generally admitted or understood. It is mainly as an illustration of the applicability of such principles to geology that I have been led to draw attention to the impressed pebbles.

In my Paper already cited, I showed that in the case of the majority of substances mechanical pressure increases their solubility. For example, if a crystal of common salt is placed in a perfectly concentrated solution, so that no more would be dissolved under the ordinary pressure, on applying to the solution a pressure of, for example, a thousand pounds to the square inch, and maintaining it for a sufficiently long time, more salt is dissolved, and is again deposited on removing the pressure. I also found that a glass rod with a small round termination, pressed with a force of ten pounds against a plate of rock salt, had in the course of a year produced a well-marked depression, surrounded by a ring of small crystals raised above the level of the original surface. The salt had been exposed to the atmosphere, in which case a thin film of moisture is generally present on the surface; and, since the force of capillary attraction varies inversely as the width between two plates, where the salt was in almost

absolute contact with the glass the force with which the liquid would penetrate between them would be very great. It therefore appears to me nearly certain that the pressure would be to a considerable extent sustained by a thin film of liquid, which being thus under pressure would dissolve more salt than the rest of the solution, and, by slow diffusion amongst it, the salt would thus be transferred from where the pressure is greatest to where it is less.

Now these experimental results entirely satisfy the conditions met with in the case of the impressed limestone pebbles. Pressed one against the other with great force, at a considerable depth below the surface of the earth, and surrounded with water saturated with carbonate of lime, in accordance with the principles I have described the limestone would dissolve, so that in time one pebble would penetrate into the other, and carbonate of lime would be deposited in a crystalline form elsewhere, where the pressure was less. This explanation agrees admirably with the various facts. The structure of the limestone proves most conclusively that the depressions were produced by the actual removal of material, and not by its yielding as a plastic substance. Moreover, it is only the carbonate of lime which has been removed—only the soluble part of the pebble—the insoluble earthy portion having been left behind at the bottom of the depressions; and therefore the removal cannot have been effected by mere mechanical means, which would have removed the whole indiscriminately. I attribute the solution of the material of one of the pebbles, and the unaltered outline of the other, to a difference in their hardness, or the amount of earthy or sandy impurities; whilst, at the same time, I think it probable that a difference in curvature may have considerable influence.

If then the principle of the convertibility of mechanical pressure into chemical action serves so well to explain the

formation of the impressed pebbles, it appears to me that it is not likely to be the only case to be met with in geological inquiries. I have indeed observed a number of facts connected with the structure of limestone rocks which cannot be explained in a satisfactory manner on any other principle. Striking examples are met with in the case of rocks affected with slaty cleavage. There certainly are some peculiarities in cleaved rocks which strongly point to the more or less chemical origin of that structure; but these can now be completely reconciled with the mechanical theory which has so much to recommend it to our acceptance. Probably various other examples will be found, to which similar principles may be applied; but, at the same time, the mechanical equivalent of chemical changes is usually so great, that we can only expect them to apply to cases where the affinities are extremely feeble.

Thanks were voted to the readers of the various Papers.

The Chairman said it was a somewhat singular fact in connection with this meeting, that, although it was a Geological Society, not a single Paper bearing upon geology had been read, if they excepted the Paper forwarded by Mr. Sorby. He hoped that at their next meeting the members would have their attention directed to one or more geological subjects. He knew much more of antiquity than of geology; but, at the same time, he should be glad to hear geological Papers read the next time the Society assembled.

W. Chadwick, Esq., of Arksey, proposed a vote of thanks to Lord Houghton for presiding.

The vote was unanimously agreed to.

His Lordship, in acknowledging it, observed that it was to such Societies as this (over which he had had the pleasure that day to preside) they were indebted for much valuable

information and research both in history and archæology. He was proud to think that of late years the most interesting feature in connection with such Associations was the desire to spread education and knowledge amongst the great mass of the people; and that especially in this large and intelligent county of York there was a growing desire not to be behind-hand in the good work such Societies were effecting. He would ask them to do whatever they could in the circles in which they moved to assist so important a Society as this

PROCEEDINGS

OF THE

GEOLOGICAL AND POLYTECHNIC SOCIETY

Of the West-Riding of Yorkshire,

AT THE SIXTY-EIGHTH (THE ANNUAL) MEETING, HELD IN THE PHILOSOPHICAL HALL, LEEDS, ON MONDAY, AUGUST 6TH, 1866, AT THREE O'CLOCK IN THE AFTERNOON.

CHARLES CHADWICK, Esq., M.D., President of the Leeds Philosophical and Literary Society, in the Chair.

Leonard Thompson, Esq., of Sheriff Hutton Park, and Fearless Barber, Esq., of Brighouse, were unanimously elected members of the Society.

The General Secretary then read the annexed financial account of the Society for the past year:—

STATEMENT OF RECEIPTS AND EXPENDITURE

OF THE GEOLOGICAL AND POLYTECHNIC SOCIETY OF THE WEST-RIDING OF YORKSHIRE.

From June, 1864, to September, 1865.

DR.	£.	s.	d.
By Cash in hands of General Secretary	2	0	4
By Subscriptions—			
From 1 Member for 1861	0	13	0
,, 3 ,, 1862	1	19	0
,, 22 ,, 1863	14	6	0
,, 92 ,, 1864	59	16	0
,, 7 ,, 1865	4	11	0
	£83	5	4

CR.	£.	s.	d.
Printing and Advertising	16	8	0
Philosophical Society for Rent of Museum Room	20	0	0
Collecting Subscriptions	2	17	4
Postages and Postage Stamps	1	17	3
Expenses of Meetings	6	0	6
Lithographing Plates	2	15	0
Subscription to the Palæontographical Society, 3 years	3	3	0
Carriage of Parcels and Sundry Expenses	0	16	9
General Secretary on Account	29	7	4
	£83	5	4

The following noblemen and gentlemen were re-elected as the officers and council of the Society for the ensuing year :—

President.

THE EARL DE GREY AND RIPON.

Vice-Presidents.

THE DUKE OF LEEDS.
THE EARL OF EFFINGHAM.
THE EARL OF HAREWOOD.
THE EARL OF DARTMOUTH.
EARL FITZWILLIAM.
LORD WHARNCLIFFE.
LORD LONDESBOROUGH.
VISCOUNT GALWAY.
VISCOUNT MILTON, M.P.
VISCOUNT HALIFAX.
EDWARD AKROYD, ESQ., M.P.
JOHN WATERHOUSE, ESQ., F.R.S.
W. B. BEAUMONT, ESQ., M.P.
E. B. DENISON, ESQ.
LORD HOUGHTON.
J. SPENCER STANHOPE, ESQ.
J. GARTH MARSHALL, ESQ.
THOMAS WILSON, ESQ., M.A.

Council.

HENRY BRIGGS, ESQ.
DR. WM. ALEXANDER.
H. C. SORBY, ESQ., F.R.S., F.G.S.
HENRY HOLT, ESQ., C.E.
BENTLEY SHAW, ESQ.
T. P. TEALE, ESQ., F.R.S.
RICHARD CARTER, ESQ., C.E.
T. W. EMBLETON, ESQ.
REV. DR. BURNETT.
DR. SCHOLEFIELD.
WM. CHADWICK, ESQ.

Honorary Secretary.

WM. SYKES WARD, ESQ., F.C.S.

General Secretary.

HENRY DENNY, ESQ., A.L.S.

Honorary Curators.

J. G. MARSHALL, ESQ., F.G.S.
T. W. EMBLETON, ESQ.

Local Secretaries.

H. C. SORBY, ESQ., Sheffield.
HENRY BRIGGS, ESQ., Wakefield.
DR. ALEXANDER, Halifax.
DR. SCHOLEFIELD, Doncaster.
BENTLEY SHAW, ESQ., Huddersfield.
RICHARD CARTER, ESQ., Barnsley.
REV. DR. BURNETT, Bradford.
DR. PALEY, Ripon.

The Chairman, having briefly addressed the meeting, and read letters from the Right Hon. Earl de Grey and Ripon, the President, and Lord Londesborough, one of the Vice-presidents, regretting their inability to preside in consequence of other public engagements, called upon Mr. Ffooks to read the first Paper :—

ON THE FLINT IMPLEMENTS AND WEAPONS FOUND AT BRIDLINGTON. BY JOHN FFOOKS, ESQ.

The pre-historic history of Britain can only be illustrated by means of an extensive collection of ancient relics, carefully examined and arranged, and by the facts which they disclose being received with unprejudiced judgment; but the extent of our researches must not be considered as bounded by the stone circle and the barrow: there are other resources of equal extent and value, if not far greater, at our command. One of these is a collection of the various weapons and implements left by the inhabitants in the Ancient British villages. These may be gathered up, with all their circumstantial information attached to them, as little affected by time as the deposits in the tombs, if done with discretion and care. The object of this Paper is to relate discoveries of this kind at Bridlington, in this county; but before doing so, I wish to point out, very briefly, the connection which exists between various sources of information which contribute their quota to increase our knowledge of the earliest inhabitants. Yorkshire appears to have been peopled as soon as any part of the island, and the immigrants who first set foot upon the shore have left memorials of the event, which are still visible in the foundations of their huts and the implements they used; and I may say they communicate their history as correctly as the people would have written it themselves, if we read it with a steady recollection of their position and circumstances. At Bridlington we find they paddled their canoes into the bay, which was then more contracted than it is now, and, upon landing, ascended the highest ground overlooking the cliff, where the soil was dry and healthy and supplied with abundance of good water, and there they built their huts; the woods in the neighbourhood supplied them with game, and the sea with a variety of fish. I shall

refer to this village again further on. They afterwards migrated to the interior, and remains of their villages are traceable on the hills and moors.

Amongst the number of settlements which exist, I notice some in particular which require special investigation, because they all differ materially, and seem to have belonged to distinct peoples or tribes. In Cleveland, on Danby Moor, Dr. Young described two parallel lines of pits, like a street, which were enclosed by an embankment, with a stream running through the centre, and at the west end a circular walled space of 35 feet in diameter, with remains of a stone circle or cromlech, and to the north several high stones, and to the south three large tumuli 100 feet apart, and to the east of these a large tumulus with a fossæ round it above the base. This unique relic of another age has yielded some important evidence, and is capable of supplying us with an entire history of its people, if examined and described as a whole; but if parts are removed without being carefully recorded, then so many pages are torn from its volume.

Another village at Skipwith is totally distinct in character. There the remains of huts, slightly raised above the level of the land, exist, which indicate a different method of keeping them dry. They are enclosed by a double line of embankment, with ditches, while the tumuli are surrounded by fossæ of a square form. The members of the Yorkshire Antiquarian Club found these barren of relics; but still they illustrate a settlement of distinct people, and form an important link of pre-historic knowledge. The flint implements which belong to them have not been identified.

The third form of foundations for huts, indicating a different people, exists at Ingleborough, where stone walls were built to support a roof. There are, no doubt, various flint implements to be found on all these sites which would identify the people with the relics that have been taken from

barrows at other places, and likewise with particular systems of fortification, such as the Skipwith double and triple line of embankment with ditches; the single line known as "Danes Dike," and the enclosed camp at Ampleforth; and the diminutive ramparts in Cleveland: all of which have their counterparts in other fortified places in England.

These distinct methods of laying out villages, and building the foundations of huts, and of fortifying them, as well as enclosing whole districts for confining the range of their cattle, are very naturally accompanied with evidence of their having had distinct modes of burial and ceremonial customs; and, from the descriptions given by antiquaries of various classes of barrows, and of different relics which have been found in them, it is evident that there were as many various kinds of interment as there were tribes or races of people in Britain at that very early period. The long barrows are considered to be the earliest of all; I presume because they are few in number, and the skulls are of the *dolicho-cephalic* type. They are certainly very peculiar, on account of their having a clay trench in them, and the remains of a large number of bodies, or rather a large quantity of bones, placed in them after cremation.

We next find distinct evidence that some of the round barrows were the tombs of a rather more civilized race, who appear to have had chiefs, and a religious ceremony at the time of interment. They did not burn the body, but doubled it up into the smallest compass (like the ancient Peruvians), and deposited it in a cist, and scattered flint implements and broken pottery about the mound of earth that they raised over the body; or otherwise bent the legs at a right angle with the body, and buried it without a cist, with a small vase near the head, as the Yorkshire Antiquarian Club found them in the Acklam tumuli; or buried numerous bodies in a sitting posture within what is supposed to have been a previous residence, and named the "Passage Mounds."

A third series of barrows are also intelligible. In these the body has undergone cremation, and the bones or ashes have been placed in a rude urn; and it is remarkable that in this class of interments a circle of stones has been erected within the circumference of the barrow, precisely similar to the stone circles that are so common on the surface; and in some instances the circle of stones has been found to enclose several cists. In another similar class of burials at Ford, in Northumberland, many cists have been found in one tumulus, with calcined bones in them, covered with a flat stone of the same kind as the cist is composed, and a very slight mound of earth raised above them, but without any circle of stones round it. These have contributed jet beads, a piece of bronze, and a flint weapon of the description which is represented at Hunter, near Bridlington, by the best class of flint implements that are found in England. This tumulus is, without doubt, a relic of the last of the flint-using tribes in Britain.

I wish here to draw your attention to the proof just mentioned that Druidical worship cannot have been connected with the stone circles, which are so numerous in this as well as other countries. If you remember, the Druidical ceremonies are not mentioned, in any ancient author, as having been performed in the great stone circles, while they are expressly stated to have been performed in the deep recesses of the oak forests; which is strong negative proof that they were disused and neglected, and had no connection with the prevailing religious customs of that period, and that the religious faith with which they were connected had been superseded by the Druidical worship; and when we find there were no stone circles round the earliest long-shaped barrows, or surrounding the most primitive round barrows, and that there can be no question that there were circles of stones intentionally placed within the circumference of the barrows that were raised by the third tribe of people, we

must conclude that this tribe brought the custom and mode of worship with them from the Continent, and established it in the island, and built a large number of the circles (which we are now studying as antiquities) for different purposes connected with their religion. As additional evidence in support of this conclusion, the excavations of a number of the barrows at Stonehenge, by Sir Richard Hoare, disclosed that the people who used iron were not buried amongst the dead in those mounds, although he found bronze in many of the tumuli.

We are also made acquainted by Sir J. Lubbock with the fact that the Avebury circle and stone avenues are very roughly formed, and distinctly indicate that they were erected by a people who were not so far advanced in the art of masonry as those who built the sister circle of Stonehenge, and that they could not have possessed such good tools for chipping the stones into shape. The explanation of this variation in the skill of the builders of these two circles appears to be disclosed by the relics of the barrows, both in the immediate neighbourhood of these circles, as well as in the northern part of England.

Sir Richard Hoare found a great many of the barrows on the Salisbury Plain without any trace of bronze in them, while he found 36 had bronze deposited with the remains; but the custom of cremation was adopted in all; and in the northern counties it has also been discovered that in one case the calcined remains of this class of burial were accompanied by bronze; while in the other instance, though the cists were surrounded by circles of stones, there was no trace of bronze. Now, the use of metal was an acquired art, which no one will believe was ever lost after its discovery; and the absence of metal in the tumuli which are surrounded by circles of stones is positive evidence that the people who were buried in them preceded those who omitted this practice, but placed bronze

with the remains of their dead; and this forms the main point of identity between these parallel instances, while it establishes the fact that the habit of erecting stone circles was introduced by the people who adopted the custom before they understood the use of metal, when they were incapable, with stone axes and chisels, to reduce stone pillars into such excellent shape as those who succeeded them and built Stonehenge. It is evident that between the interval of the building of these two circles a gradual improvement in science had taken place, in consequence of the Phœnician merchants having supplied them with implements of bronze manufactured for their use.

The flint implements found at Bridlington add the weight of their evidence to this conclusion, and, if I have interpreted their signification correctly, they explain and confirm the course of events which I have deduced from the variation in the mode of burial and the distribution of the relics found in the tumuli, where the three first classes are without a trace of metal, and the fourth with bronze. At Bridlington three distinct classes of flint implements bear evidence that their owners were not acquainted with the use of metal; and a fourth, at Hunter, are of the class of implements that correspond with the implements of flint that were found with bronze in the Ford tumulus; while the fifth class of tumuli, which has iron deposited in them with bronze, has no representative in flint at Bridlington; and yet the presence of a conqueror is everywhere visible in the distribution of the flint implements of the other tribes.

In this fifth class of tumuli we find the people who were buried in them possessed a great additional instalment of the knowledge of the arts which distinguishes civilization from barbaric ignorance, and express by the description of relics (which includes a war chariot) that they were the people whom Cæsar encountered. These people dispensed with

cremation, and with this religious custom the religion that had previously existed, which required such structures as the enclosures at Avebury and Stonehenge.

In these tumuli the chief is laid in an excavated cist, with his arms folded across his breast, and with his legs crossed; the head of a wild boar, a wheel of a chariot, and a horse placed on either side of the body; the wheels made of oak, which had an iron tire on them; with various ornaments of iron plated with copper, and rings and buckles with their tongues remaining in them, as well as pieces of iron, which were supposed to be the bridle bits. The umbra and bosses of bronze, which formed part of a shield, arrow-points, and spear-heads of iron, and a variety of personal ornaments made of these metals, have also been found in these tumuli.

No one can examine these different classes of relics without feeling their distinctness of character, and perceiving that different customs prevailed during each separate era, although they all raised mounds over the remains of the dead; nor does there seem to be anything extraordinary in this sudden change of people and religion; for if we were to hazard a conjecture, without any further evidence, we should assuredly conclude that the last people could not have failed to overthrow the others, and dominate in the islands, and impose their religion on the conquered, from their being in possession of metal weapons; while it follows, as a logical deduction, that if the last were Druids, and they did not use the stone circles, some previous people must have built and worshipped within their precincts. Still, as we are involved in such a maze of dark illusions, we naturally grasp with satisfaction any convincing evidence that may present itself, to throw light upon the twin questions, When was iron first used in England? and, Was its value discovered by the inhabitants or brought by invaders? and, When was the religion extinguished which required such structures as Avebury and Stonehenge?

That these two events are closely connected is probably the reason why we shall ultimately arrive at a correct conclusion relating to both; but, since there is no written testimony regarding either, there is no resource from whence any positive evidence can be derived, except the remains of the barrows and flint implements in the ancient villages of the Britons.

I shall now confine my remarks to the flint implements and weapons which are found at Bridlington, and to some ancient fortified lines of intrenchment in the neighbourhood, which were constructed by the people who used these flint implements.

Soon after I had commenced making a collection of these relics, I discovered that at some places white flint was used, at others gray, and sometimes both these coloured flints, by the same people, but that there was a marked difference in their form, as well as colour, and then that a distinct people had come among them, who used only red and black coloured flint; and these, with other reasons which will be apparent in the context, made me decide that I must divide them into classes. I found that those who used only white flint had two settlements, one on the cliff at Sewerby, and the other at Bempton, and that they manufactured their implements in such a rude, unskilful manner, that, although they are evidently intended for the same use as those made by other people, yet, if they were not specimens of the first attempts to manufacture flint into useful implements, no person would pick them up; but, as they form the first link of the chain of pre-historic evidence, their value in a museum is infinitely enhanced. But this observation must be understood to relate to the implements found at these two places only, as at other parts white flint is manufactured into beautiful forms.

The gray flint implements have a peculiarly small, stunted form; but those who made them had a very superior know-

ledge of the art of chipping flint, and, from this kind having become the most common, it must be supposed the people who made them were much the most numerous.

Those who used the red or black coloured flint appear to have been comparatively few in number; but they manufactured their implements upon a larger scale than the gray, and with a bold, skilful stroke, which give them an entirely distinct character.

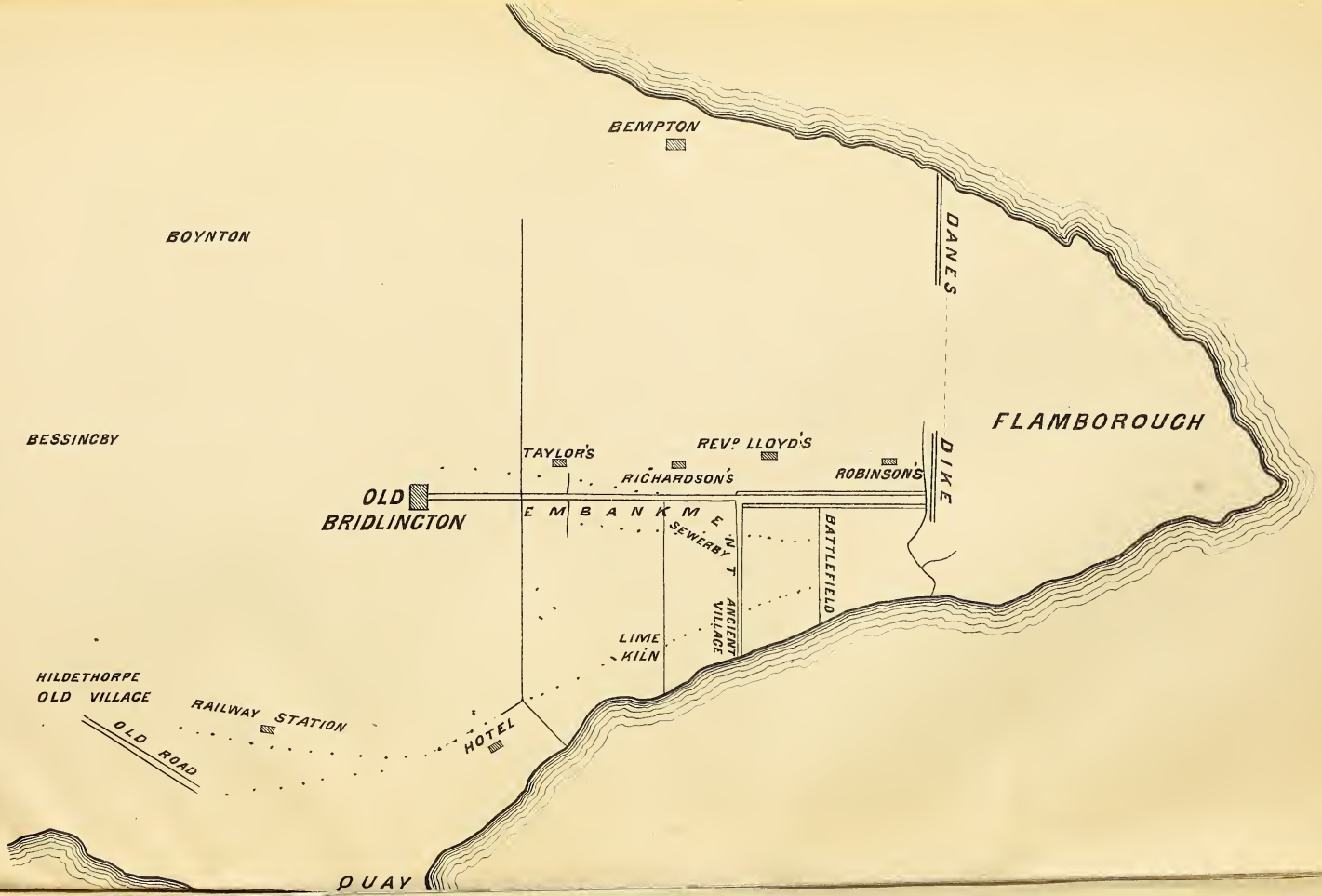
There appears to be considerable misapprehension respecting the degree of skill in manufacturing flint implements, many scientific persons supposing that none but the implements that have been minutely chipped into form are to be considered excellent workmanship; but in this Bridlington district there appears to have been a uniform method of forming the implements, by chipping slices off their entire length, and thus by three or four skilful blows producing the desired pattern; while at Hunter, though only an adjoining parish, the method of producing the finest implements was by chipping off small pieces, or very narrow slices, and thus, by minute and patient ingenuity, producing the shape and beauty which some of them possess.

I may make another useful observation with regard to forms. It is commonly thought that there are only a few forms in which flint implements were made; but the truth is they were extremely various, and may be properly compared to our modern household implements, our mechanics' tools, and our military and ordinary weapons. By comparing the implements found at all points of this district, it cannot be doubted that the families who used the white flint were far more limited in their knowledge of the civilizing arts than those who followed them. They appear to have been confined to killing wild animals for food and clothing, and to fishing. They may have made things of wicker-work, and canoes; but they had no saws, planes, drills, or hatchets, which we find the other tribes possessed.

Those who used the ordinary cut gray flints were much more enlightened; they were skilled in the art of making pottery, wicker-work, coopering, and general carpentry, and canoe building, and they cultivated grain; while those who made their implements of red and black flint were undoubtedly far in advance of either: but there can be no doubt that they all remained in ignorance of the use of metal. This is apparent from the description of tools which they used. A flint hatchet is a poor substitute for an iron one, a flint plane would never have made smooth work, a flint saw must have been only useful for cutting bone, and flint fish-hooks of the most perfect form must have been very difficult to procure. The flint drills (although they show the principle of the screw was understood) must have been very difficult to use, and very imperfect instruments; flint knives and other cutting implements, while they show by their excellent edges how much pains was taken in their manufacture, at the same time show how much the people required iron. Flint arrow-points and spear-heads, we find, went out of use after iron was introduced, but sling-stones were more available, and therefore were used down to a late period.

The district included in this Paper is not more than two miles in extent in any direction, commencing at Hildethorpe and ending at Danes Dike, and in the transverse direction from Bridlington to Bempton (see plate); but it forms a distinct district, because, not only are all the classes of flint implements found there associated with the earthworks, but there is distinct evidence that the people were all on friendly terms, when a sudden catastrophe overtook them, and they were all driven from the district at one time, and never returned to it; yet the weapons used by the invaders can nowhere be found, which is sufficient negative proof that they were the people who first used iron.

At Sewerby I found there had been an Ancient British


BEMPTON
BOYNTON
DANES DIKE
FLAMBOROUGH
BESSINGBY
TAYLOR'S
REVd LLOYD'S
RICHARDSON'S
ROBINSON'S
OLD BRIDLINGTON
EMBANKMENT
SEWERBY
ANCIENT VILLAGE
BATTLEFIELD
LIME KILN
HILDETHORPE OLD VILLAGE
RAILWAY STATION
OLD ROAD
HOTEL
QUAY

village, of which only a few traces remain, in the field in front of the Rev. Mr. Lloyd's house, the chief part having been destroyed by the falling of the cliff that once extended into the bay an unknown distance. This village had been enclosed by an earthwork 10 feet high by 14 feet across the base, which appears to have commenced at the cliff, and, passing round the eastern side of the village, was continued on in nearly a straight line to old Bridlington, to which point it can be easily traced, but not further, though it is not probable that it was intended to have terminated there abruptly. It was perfect up to the time of the enclosure of the parish about 60 years since, when the present road was formed, which is partly on the line of the embankment; but where it deviated, to form a more direct line, there some part of the old embankment remains nearly perfect.

There were also two lines of embankment from the angle at Sewerby, leading in a straight line to the "Danes Dike," with a road between them, which was intended to connect the two great lines of intrenchment, and to form a secure passage for cattle from one to the other. One of these banks was taken away at the same time that the new road was formed, but a part of the other bank still remains, with a hedge planted upon it. The sunk fence in front of Mr. Lloyd's house is a part of the enclosed road, and shows its original level, with its exact line and position.*

Danes Dike is a natural ravine, which drained the south side of the promontory which forms the parish of Flamborough, and does not extend far. The embankment which crowns the eastern edge of it was intended to have been carried across the promontory, but it was only commenced at the two extremities, when those who were forming it were

* I received this information from a very old man, named William Ward, who is now in the employ of Mr. Lloyd, and remembers the alteration being made.

interrupted; and this event appears to explain why the line leading to old Bridlington was also left unfinished.

When we look at the strategical effect of the two embankments, running at right angles, we can easily comprehend that the intention was, first, to form strong encampments against attack from any quarter, and at the same time to command a safe retreat in case of either being carried by assault.

I have mentioned the classes of flint implements that are found in this neighbourhood. I have now to describe the discovery of several distinct sets of implements, that indicate there were different trades established at that early period; and, in order to convey to you the expression of my feeling regarding their significance, I shall transcribe the notes which I made at the time I collected them, which I still think are based on correct reasoning.

I commenced March, 1865. On the left hand side of Mr. Robinson's farm-house, if facing Danes Dike, I found the whole of the implements of three families, lying on the surface in three heaps, only slightly scattered by the plough, on the elevated ridges of an undulating field; they are of a peculiar reddish-yellow and greenish-black colour. The disposition of these weapons appeared to indicate that there had been fighting in the field; for, although the household implements and tools were lying together, on three sites, where I presume the huts of the people stood, the weapons were all scattered at a distance from them, round sets of implements which, I have strong grounds for believing, were dress-fastenings, and which showed that both men and women were killed there; and I could not doubt that they had all decayed upon the surface without having been buried, and that their relics had lain where I found them from the day of the fight. As the number that were killed here was only small, I conclude it was simply in defence of their

homes—a vain effort! they were all either killed or fled, and none ever returned to bury their relatives, or remove the excellent implements that they possessed. There must have been a reason for this. Some of the sling-stones, of gray colour, that I found here are the common kind found in the neighbourhood, that, no doubt, belonged to friends who assisted them. I afterwards found a few red flint weapons on a battlefield close by; and I have no doubt some who survived reciprocated the kindness by joining in the general engagement.

I consider these three families represent the last race that emigrated to this island previous to the use of iron, and that they had only recently become friendly with the older inhabitants. The implements found here are the most varied and the best assortment that have been ever found together in this neighbourhood, but they indicate that the people did not understand the use of metal. They consisted of tools that are considered to have been used for basket-making or wicker-work, coopering, carpentry, and fishing; such as hatchets, hammers, nails, chisels, wedges of various sizes, drills, scrapers for cleaning skins or for stripping willows, and fish-hooks, as well as weapons which may be named javelins, bills or beaks, beautifully-formed sling-stones, spear-heads, arrow-points, and the supposed dress-fastenings, as well as a large number and variety of knives of all sizes, and curiously-shaped implements, the use of which is not now understood.

A short distance from this place, on the right, in a field abutting upon the grounds in front of Mr. Lloyd's house, and immediately between the cliff and the double line of embankment before described, there is undoubted evidence of a severe battle having been fought; it was literally strewed with sling-stones, spear-heads, and dress-fastenings, with a very few general implements, and, with the exception of a few red

flint weapons, the whole were of gray flint. To me, the dress-fastenings appeared the most convincing proof that a battle was fought there, for where I found one I invariably found three. I have since noticed this fact as being a general rule all over the district, which precludes any doubt of the truthfulness of this test; and I have been enabled by it to understand what was the fate of the people.

When I found so much evidence of fighting in this field, and that neither the weapons nor dress-fastenings had been taken away since the battle was fought, and that the field could not have been occupied as a place of residence again, I concluded that the invaders had won the battle. I was struck, also, by the fact that there were no weapons, or any other relics, that could have belonged to the invaders. This appeared to be a most important fact, as it clearly shows that they used metal weapons, which corrosion has totally destroyed during the time that has elapsed, or, being of value, every vestige has been taken away. I afterwards noticed this absence of all remains of implements or weapons which could have been used by the invaders, throughout the district. This battlefield extended further towards the sea than it does now, probably half a mile, so that it is impossible to conjecture the numbers that were engaged; it may, however, be considered fortunate that even this extreme end of the battle-ground remains. The double embankment was evidently used as a protection on the left wing, as the relics of the fight terminate at this line, and the line of battle was immediately in front of the embankment which enclosed the village of Sewerby, where the white flint implements were only used. I conclude that this embankment was not defended, but that when they were beaten they were pursued over the embankment, and the village was destroyed, and not afterwards occupied, at least by flint-using people, as there are traces of a flying host from the battlefield across the district and far beyond.

Passing over the Sewerby fields, numbers of sets of dress-fastenings and weapons can be found leading in two directions, one towards old Bridlington, and the other towards Hildethorpe, past the quay. There is a cross road leading from the sea to the upper Sewerby road. A limekiln on this road marks where there were some huts that were inhabited by people who used gray and white flints. The women of the neighbouring village of Sewerby appear to have fled for refuge to a field a little below these cottages, which was very low ground, and was probably covered with underwood and rushes, and to have been pursued there and slaughtered; as I found in this field a great number of women's dress-fastenings, and a number of sling-stones which they had used in their defence.

On the other side of this low ground, which is now intersected by the railroad embankment, I found on an elevated mound an entire set of what I suppose to be coopers' and basket-makers' tools* (see note), formed of gray flint; and

* [As basket-making may appear to some persons too modern a process, or trade, to ascribe to the primitive inhabitants of this country, I venture to extract a few passages bearing on the subject from a valuable paper in the fifteenth volume of the *Journal of the Archæological Association*, by G. J. French, "On the Sculptured Stones of Scotland, Ireland, &c.," in which the interlaced ornamentation so common on these ancient relics naturally suggested the origin of such decorations from the earlier basket-work:—"The aborigines of this or any other country of corresponding climate, after discovering some natural cave, or making for themselves a rude hut, would probably take their next step in constructive art by attempting to form such utensils as might contain the seeds and fruits necessary for food. Assuming that they were then unprovided with even the rudest tools—for we refer to a time before our far-off ancestors knew the use of bronze or iron,—they would form these utensils by twisting together the long pliant osiers with which the land abounded. . . . No other branch of art is even now so independent of tools, and none has been so universally diffused, or so long and uninterruptedly practised, as basket-making. It is the humble parent of all textile art—the most elaborate tissues produced by the loom or the needle being but progressive developments proceeding from the rude wattle-work of unclothed savages. . . . The earliest authentic records of Britain refer to its inhabitants as expert basket-makers; their houses were made of willows and

on another elevated part of the same field, very close to this mound, a large number of general household implements. The whole of them are remarkably well formed, and appear to have been constantly in use for a long time, and their adaptation to the trades are so perfect, that a cooper could use them without difficulty at the present time. They consisted of small axes fit for cutting willows, small scrapers for stripping them, hand-instruments for forcing the willows into place in the

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reeds; their fences and fortifications were living trees with intertwisted branches; their boats, or coracles, were baskets covered with skins; their domestic furniture, defensive armour, even their images employed in their erroneous religion, were of basket-work. . . . The monastic historians of the succeeding ages continue to mention wicker-work as the principal architectural material used in Britain and Ireland, not only for the rude dwellings of the inhabitants, but also for their more important public edifices and churches." Glastonbury, supposed to have been the earliest Christian church in England, was, on the authority of William of Malmesbury, "a mean structure of *wattle-work*." A manufacture which was probably progressing for many centuries before the Romans invaded Britain must necessarily have acquired a certain amount of refined ornament, as a result of so much experience and practice. We have, indeed, indirect evidence that the Romans greatly admired the ornamental baskets of the British, which were exported in large quantities to Rome, and became fashionable appendages among the extravagantly luxurious furniture of the imperial city. Juvenal, writing about A.D. 120, mentions the popularity of these baskets: "*Adde et bascaudas et mille escaria*" (*Juvenal*, Sat. xii. v. 46). And that they were productions of the British islanders is distinctly stated by Martial—

> "*Barbara de pictis veni bascauda Britannis,*
> *Sed me jam mavult dicere Roma suam.*"—*Martial, lib.* xiv. *Epig.* 99.

Mr. French also believes that the earliest symbols of the Christian faith—crosses, erected by the first Christian missionaries—were constructed of basket-work, which was closely connected with the earlier pagan or Druidical religion. Cæsar, writing of the Druids, states that "they have images of enormous size, the limbs of which, formed of wicker-work, they fill with living men, which being set on fire the men perish enveloped in flames" (*De Bell. Gal., lib.* vi.). Again, Mr. Bateman, in his *Ten Years' Diggings*, found at Throwley "a deposit of large pieces of calcined human bones, which lay within a circular hole in the natural soil, about a foot deep, of well-defined shape, resulting from contact with a wooden or *wicker-work vessel*, in which the bones were placed when buried, the vestiges of which, in the form of impalpable black powder, intervened between the bones and the earth" (p. 130).—H. Denny.

process of basket-making, chisels, wedges with sharp edges of various sizes, a blunt-edged hatchet for driving down hoops of casks or wicker-work, blunt wedges, also, similar to those used by coopers for driving hoops, knives, a saw, and various other implements. There were also a number of sling-stones, spear-heads, and tomahawks, with dress-fastenings scattered about the field, showing that some few persons had been killed there.

At another part of the same field I found an entire set of the supposed coopers' tools, formed of red flint, all new. They are beautifully formed, but much larger in size than the others made of gray flint. These red tools were as entirely separate from the others as if the owners had lived miles apart. The most remarkable thing is, that these red tools appear never to have been used after they were made. They seem to express that the person who was to have used them had just come there to work with the other people, when he and they were attacked, and either killed or driven away, and never returned; and it is certainly as strong a proof as could be discovered of the overwhelming character of the attack that was made upon them; the evidence of fighting in the field cannot be considered to have been merely between themselves, or with other natives whom they were unfriendly with in the adjoining fields. If such had been the case, it is not probable that all would have been killed, or that they would have been driven out of the neighbourhood; but it is quite certain that if only people had been fighting here who used flint implements, those who expelled the others would not have left their excellent tools upon the ground. Yet here were found both gray flint implements which had been much used, and red flint which appear not to have been used at all, lying on two distinct parts of the same field, with no remains of any enemy's weapons.

Nor can it be said that these tools were abandoned because

of the introduction of metal. There is no sign of any gradual change taking place, as even the older tools made of gray flint are good, and were apparently in use at the time of the catastrophe, and the red ones were quite new: in fact, if any change of the kind was taking place, it was from gray flint implements to red ones; but this does not account for both kinds having been left on two spots where the people had their workshops. The man who owned the red flint tools had certainly not bought them, or made them with the intention of not using them, and there must have been an impossibility for the people who were driven from their homes to have returned again to remove their valuable implements, or they would have done so. At the same time we perceive that those who drove them from their homes did not value the rude flint implements that the vanquished had left, or they would have appropriated them after they had expelled their owners. Every circumstance, therefore, leads me to suppose that the people who expelled them must have used metal weapons.

Passing along the cliff towards Bridlington Quay, on a field on the north side of the new Alexandra Hotel, which was ploughed up this year (1866), I found various things that appear to have been used only for the purpose of agriculture; and, from the positions of the tools, I considered they had been left in scattered buildings that were connected with the residence. They consist of what appear to be well-defined ploughshares of stone, with their coulters of flint, and stone wedges to fasten the framework of the ploughs together; two stone hammers, a part of a machine of stone for grinding corn, hatchets of stone and flint, with various knives, spear-heads and sling-stones of both stone and flint. These flint implements are of the red and black colours, and the corn bruiser agrees in form with one found with the relics of the three families. In other instances I have found farming

tools in connection with these coloured flints, which seems to indicate that some of this race were farmers, who followed that occupation alone, while the collection of implements shows how few things a cultivator of the soil required at that time.

From the evidence of this district, I believe the people who used the red and black flint were the first people who adopted farming as a distinct trade, which must have been a considerable advance in civilization beyond their predecessors.

The next most remarkable collection which I made was in a field opposite the portico of the railway station at Bridlington. I am not aware how long this field had been ploughed up, but I could not fail to be astonished when I found within a square yard of ground an entire set of tools made of flint, which appear to have been only used by a carpenter, as they consist of hatchets, a plane, a hammer, various kinds of wedges (evidently formed for different uses), drills, and a stone ploughshare (as if the carpenter had been employed in making a plough). There were several sling-stones lying near, and one spear-head, but no evidence of his having lived there, as a single small knife constituted all the household implements on the spot. It could only have been his workshop; and he, with all the other flint-using people in the neighbourhood, had either been killed or driven away, and had not returned to remove these implements, which show so clearly that he was engaged in a distinct trade, and by their colour and size that he was one of the race that used red and black flint.

This brings the link of evidence from the field of battle to Hildethorpe, where there was a large village occupied by people who used white and gray-coloured flint. I was not sufficiently careful in collecting the implements in these fields, as it was the first that I examined; but those that I can still identify as having been found there, as well as those which I have since taken up on the spot to verify my knowledge of

their character, are sufficiently distinct for me to describe them as being of the common type of gray and white flints, and to know that the people who lived there were driven from the place after considerable slaughter. Dress-fastenings can be found in all directions without difficulty, though most of the weapons have been picked up. A large number of the implements which constitute my general collection were found in this village, and will ever be valuable for their description of the forms associated with each colour.

Returning to the battlefield, we may follow the other line of retreat in the direction of old Bridlington, and in this instance, as in the former, there is no difficulty in tracing the line by the sling-stones and dress-fastenings, which are always accompanied by weapons which the persons used who were killed and decayed on these fields. They are very numerous on both sides of the embankment. When I came to the field lying to the right of the road leading to old Bridlington from Sewerby, that is beyond and slopes down to the farm-house occupied by Mr. Richardson, I found a complete set of what I designate coopers' tools, and with them an excellent chisel. They were all made of gray flint. The chisel was formed by being first chipped into shape, and then rubbed on one side of the edge nearly smooth, showing that the maker or user of it knew perfectly what he wanted, but at the same time did not understand the mechanical method of grinding, and was, therefore, satisfied by rubbing the edge on one side only, to make it as sharp as he could. This fact proves the great antiquity of the tool. On the slope of the hill, about a hundred yards from these tools, I found several sets of dress-fastenings, of three each, as usual; each set had its sling-stones and spear-heads lying close around them, one of them had a tomahawk, another a small axe, and another a large-sized beak; and having become thoroughly acquainted with the character of these relics, their position

appeared peculiarly interesting, as describing minutely what occurred in that field. The men seemed to have fled in the direction of their homes, and to have been exhausted by the length of their flight as they ascended the hill, the enemy in pursuit following close upon them. There these men fell, and decayed, and I was the first who had observed their relics, after thousands of years had passed away. I could not avoid feeling sympathy for them, though there remained no trace of human forms. The imperishable weapons which they had used, and the dress-fastenings they had worn, which lay before me, testified that they were killed in defence of their homes, and that the enemy had passed on in pursuit of their kinsmen, I knew not where; but I felt confident that none of their friends had returned to bury them, or remove the implements which they must have highly valued: and it was evident their conquerors considered them of no value, for the reason I have given.

In a paragraph which I cut out of a newspaper, copied from the American *Washington Star*, I observe how identical the mode of recognizing the place where men have fallen in battle may be of distant eras. Quartermaster-General Meigs was contemplating the removal of the remains of Union soldiers, and he remarked—"They lay together, friend and foe; and a *button or two*, or a shred of blue or gray clothing, afforded an uncertain index of their politics."—*May*, 1866.

In a field on the left side of the old embankment, I found quite a line of dress-fastenings and weapons. On the other side of the road, which is on the old embankment, opposite Mr. Taylor's farm-house, there had been a settlement, and there implements and weapons in considerable numbers, with dress-fastenings, lay in a straight narrow line through the field. These lines of relics seemed to indicate that a stand had been made here, and many were killed, but the continuing evidence of weapons thrown away shows it was ineffectual.

Rather to the north, in a small field, I found there had been another small settlement, and there all the implements and weapons that the people possessed had been abandoned. Such is the kind of evidence in all directions, invariably leading towards the west, which, probably, may be traced in this way until some interior settlement is reached where they gained security from the pursuit of their enemies. At Bempton I found precisely the same features as at Sewerby. There white flint had been entirely used in some fields, and gray in others; and all were abandoned, with no apparent cause but devastating war, which the people could not resist, and therefore fled from their homes, and left the country in the hands of their conquerors, whose weapons are nowhere to be found.

In the Paper on Ancient British Coins, read by Mr. Evans at your last meeting, he alluded to some historical facts in a manner which corroborates my impression, that the last people who inhabited Bridlington before the Roman invasion were the first people who were acquainted with the general use of metals. He said: "As far as I know, the Ancient British coins are confined to the *South Eastern* portion of the territory of the Brigantes, and have not been found in Lancashire or the counties north of Yorkshire, and they certainly do not appear to have derived their coinage from the Iceni."

This confines it to Holderness, in which district Bridlington is situated.

I object to the people being confounded with the Brigantes, as there can be no doubt that they were Gauls, and known as the Parisoi.

If we couple another historical passage of his to this one, it will express the length of time that the people who then possessed Bridlington had been there, which agrees with my idea of this people having conquered the old inhabitants and

driven them into the interior. He said: "The immigrants from the Continent who had *driven back the earlier inhabitants into the interior*, were, no doubt, considerably in advance of them in civilization, and were *the first* to introduce the art of coining. . ." And again: "With reference to the date of the Yorkshire coins there is a certain amount of evidence to guide us. Their type is perhaps the rudest of all the copies from the prototype, and so barbarous in imitation of the Philippus as to place them amongst the latest of the British coins. The metal is also much deteriorated." In other words, they were the last invaders from Gaul before the Romans.

The collection of weapons and implements mentioned in this account of my researches are in the hands of Mr. Postil, jun., and Mr. G. Anfield, jun., to be handed over to trustees that are to be appointed by the Sailors' Club, in Bridlington, in order to preserve them for general inspection, and form the nucleus of a museum of relics from the neighbourhood. They have been preserved for thousands of years, through the absence of public curiosity regarding the earliest emigrants to this island. I trust the information which they convey—that can be found in no history—will induce the present and future generations to preserve them as indelible records of past ages during the infancy of Great Britain.

In a discussion which ensued after the reading of the Paper, the following questions were asked, and replied to by Mr. Ffooks:—

1st.—"How can you identify the dress-fastenings?"

"By their general form, which is not adapted for any other use. By there being always a notch chipped out of one, or both sides of the neck, to prevent the thong slipping that was attached to it; and by there being always three found within the length of a man, of three sizes, a large one,

a middle-sized, and a small one, and some weapons close to them."

2nd.—"Are the flint weapons and dress-fastenings found in all the fields in the neighbourhood?"

"No; only where they can be readily accounted for. Many fields have no flint implements upon them, or only stray weapons, thrown by the people when hunting."

Mr. Denny read the next Paper:—

NOTICE OF EARLY BRITISH TUMULI ON THE HAMBLETON HILLS, NEAR THIRSK. BY HENRY DENNY, A.L.S., OF LEEDS.

To know something of the district in which we reside, the historical events of which it has been the theatre, or the various peoples and races who have preceded us, ought to be subjects of deep interest to every thinking mind. For what can be a more interesting or instructive study than to compare the present with the past, even as regards the various phases in the history of the human family since their first occupation of Britain?

It is true, much information as to the past is already placed on record. But it is equally true that much which is prehistoric remains to be collected and collated by those of the present generation, or the materials now accessible will be irretrievably lost; and although the surface of the country, on the one hand, may have undergone many and mighty changes, thus leaving little to mark the actual site of memorable occurrences which are presumed to have taken place in particular localities, its primeval inhabitants, on the other, have left us only their burial-mounds, the sites of their Oppida or fortified villages, to indicate the tribe or nation to which they belonged; yet even these memorials, after the lapse of many centuries, furnish so many faithful

records or pages in the history of the people to whom they refer; and though at best but scanty, are all the materials we have to guide us in compiling the earliest and most important chapters in the chronicles of the nation to which we belong, or the county wherein we reside.

When Cæsar landed in Kent, in the year 55 B.C., he found this country inhabited by various races of men, known under the general name of Ancient Britons. But different portions of it were occupied by separate tribes, under distinct rulers; hence these different localities are associated with the historical records of those early races, and each portion has some memorable occurrences connected with its people, their wars, or subjugation. Thus the Malvern and Breiddyn Hills witnessed the last defence and defeat of the Silures under Caractacus; while, probably, Cambridge witnessed that of the noble Boadicea and the Iceni of Norfolk and Suffolk; and those tribes inhabiting the coasts of Kent and Sussex had to contend with, and finally succumb to, the repeated attacks of the Roman and other hostile invaders, who in succession landed in Britain.

But probably no portion of this island is so rich in historical associations, or has shared more in the vicissitudes attendant upon war or internal rebellion, than Yorkshire. In the fastnesses of its hills, and on its extensive moors to the north, dwelt the Brigantes, the most powerful nation of the aboriginal Britons; and on the south-east coast the Parisoi, a maritime tribe of importance. From one extremity of the county to the other, the soil has resounded to the tread of the conquering legions of Rome. The Saxons, Picts, and Danes have in like manner exhibited their military prowess on its mountains, plains, and shores; and, if we come down to more recent scenes of strife, as my old friend Professor Phillips has said, "from the walls of York we may see three decisive battlefields,—where *Hadrada* fell at Stamford Brig,

Clifford died at Towton Dale, and *Rupert* fled from Marston Moor."

It is, however, to the earlier period of our history only that I have now to add a short paragraph "On the burial-mounds of our ancestors in the neighbourhood of Thirsk;" though I am well aware that to many persons the examination of these early graves, or tumuli, with their rude implements of flint and vessels of sun-dried clay, possesses no interest or value. But such parties probably forget that these memorials form an important link in the chain of past history, and are intimately connected with the present; that they contain the progenitors of our own race, with whose origin and progress we ought surely to be anxious to become familiar, as the Briton of to-day owes his elevated and social position entirely to the various nations by whom this island has been conquered or colonized, and whose remains, now disinterred from their burial-mounds with the simple objects the latter contain, alone mark the slow progress of the skin-clad hunter of Britain in the arts of war and peace, and contrast strongly with the refined productions of their Roman subjugators, and even with their subsequent and less civilized Saxon rulers.

The northern and eastern parts of this county still exhibit numerous tumuli, earthworks, and intrenchments of the Britons, Anglo-Saxons, &c., in the former of which peaceably repose the remains of those hardy defenders of their native fastnesses. From the elevated position of these rude constructions on the Hambleton Hills (a magnificent range, extending for eighteen miles), an extensive panoramic view of the surrounding country is commanded. And here was, doubtless, a strongly-fortified position in the year 50, when Iseur, afterwards Isurium of the Romans (of which Aldborough near Boroughbridge is the site), was the capital of the Brigantes, under Cartismandua, and afterwards occupied by the revolted Britons under Venutius against their perfidious

queen, and again during the civil wars, from the year 52 to 70; or it may have been one of the last strongholds of the Britons, to which they retreated from the invading forces of the Romans under Petilius Cerealis, and also subsequently that of the Anglo-Saxons.

On glancing at the Ordnance Map, embracing that portion of the Hambleton Hills in the neighbourhood of Thirsk, numerous tumuli are indicated—on Boltby Moor, Hesketh Moor, Hawnby Moor, Kepwick Moor, and Southwoods,—nearly all of which have been examined by the Rev. W. Greenwell, of Durham; Mr. Craster, of Middlesbrough; Mr. Verity, of Southwoods; and Mr. Murray, of Daleside; with varied results, some of which I purpose to detail. My own attention was first called to this locality and its sepulchral mounds by an interesting series of objects presented to the Museum of the Philosophical Hall by Jas. Fox, Esq., C.E., which had been obtained by Mr. Johnson, of Hesketh Hall, on the 9th of July, 1864, from a tumulus on the adjoining moor, 1,025 feet above the level of the sea. As these objects presented a somewhat varied character, and also differed in manufacture so as to suggest a difference of date, it appeared highly desirable that another examination of the tumulus should be made, and all the circumstances of disinterment carefully inquired into as far as was possible. I therefore visited the locality myself on two occasions, in August and September, as also in company with Mr. Fox and Mr. Abraham Horsfall, of Leeds, and explored what remained of this tumulus, and of three others in the adjoining fields; and I can bear witness to the zeal which both these gentlemen displayed in the laborious task of grave-digging. The tumulus just referred to was about 50 feet in diameter, and probably 3 feet 6 inches in height above the surface of the moor, of a conical shape, and appeared to contain indications of having been used on more than *one* occasion as a place of

burial. On the north side, at about two feet below the surface, the skeleton of a female had been found extended at length, and was probably that of a young person. The skull was destroyed, but near the neck were the remains of a necklace, which originally consisted of, probably, about 120 variously-shaped beads of jet and kimmerage coal; of these forty-seven are of cylindrical form, and twelve are slightly conical studs, about the size of a shilling, pierced on the back with two holes meeting at an angle in the centre. Both these forms are much acted upon by time, and are beginning to split up, while the remaining fifty-six were small circular discs perforated in the centre, slightly countersunk, and quite unaltered by time; also a connecting fragment of bone. In a similar necklace, found by the Rev. W. Greenwell in Northumberland, the beads were also of two different materials, *jet* and *shale*. Towards the centre of the tumulus, and about five feet below the surface, the remains of several skeletons were found, of various ages and characters; in one lower jaw the last molar or dens sapientiæ was just breaking through, while in another the alveolar cavities were entirely absorbed, indicating, on the contrary, extreme old age. Again, while the frontal bones in several were of the ordinary form, one of the skulls had the low receding forehead and the superciliary ridge very prominent. All the bones were intermixed with soil, fragments of pottery, and chippings of flint. There were also numerous shells of helix nemoralis and zonites radiatus, whitened by age. It may suggest a curious inquiry, How had these shells become associated with the other remains? They could not have been of *recent* introduction, as no apertures existed, and I found them in the firmly-packed soil, which had not been removed for a long period. If a single individual or two had been exhumed, and near the surface, the above supposition might have been probable, but here they occurred in too great a number to have

entered when the barrows were temporarily plundered and filled up again. The former species also occurred at a considerable depth below stalagmite in the Dowkerbottom cave, near an infant's grave. Could they have been interred with the original occupants of the barrow as articles of food, or for some other superstitious rite at present unknown to us? Above the whole, a considerable number of flat masses of limestone had been placed, apparently to form a cairn. On the east side of the tumulus, about three feet from the surface, a layer of calcined bones, perfectly white, were discovered, showing that a separate interment, evidently after cremation, had taken place.

From the fragmentary condition and heterogeneous assemblage of objects in this tumulus I suspected that it had been previously disturbed, and the bones and other remains thrown in again by the ruthless treasure-seekers.

A careful examination of the fragments of pottery found therein indicates that originally there had been five vessels, of different sizes and varied form and ornamentation. Two, which I have been able partially to restore, were what Sir Colt Hoare terms drinking-cups, and are, as I am informed by the Rev. Wm. Greenwell, of Durham, rare examples of the kind. The portions of two others differ from the preceding; one, which has been also a drinking-cup, having the herring-bone or lozenge-shaped pattern on the upper part, and below parallel perpendicular lines separated by broad transverse plain bands; while the fourth fragment is a much stronger vessel, a cinerary urn; the fifth resembling the coarse black Roman pottery, with indications of burning.

The number of apparently independent fragments of different urns, mixed with the bones and chippings of flint, is a curious circumstance, affording a somewhat conclusive evidence that in many instances they are *not* the portions of urns which had been subsequently broken, as then the con-

necting fragments might be again recognized and restored; but that these had been *fragments only* when originally deposited with the bodies. Again, the flint chippings appear somewhat obscure as to their use. Flint implements, or articles of personal decoration, have a history attached to them, as connected probably with the former owner with whom they are interred.

In the tomb of Mithridates, in the neighbourhood of Kertch, which was in a huge tumulus 120 feet in height by 150 feet in diameter, the skeleton of the king was discovered, with various golden ornaments, his sword, &c., and a multitude of little *sharp flints* were lying at the feet heaped up in a pyramidal form.*

There seems to be an allusion to this custom in the Septuagint Version of the book of Joshua, chapter 24, verse 31, for the following translation of which I am indebted to the Rev. Canon Atlay, D.D., vicar of Leeds, which reads thus: "There they placed with him, in the tomb where they buried him, the stone knives with which he circumcised the children of Israel, at Gilgal, when he brought them out of Egypt, as the Lord commanded them; and there they are until this very day."

Now although this passage does not appear in the present Masoretic text of the book of Joshua, and may therefore be presumed as an *addition* to the original text, it matters little, as it clearly proves that the practice of interring stone implements with the dead was known at least 300 years before Christ. As instances like the above are not of unfrequent occurrence, both in Britain as well as on the Continent, they have had evidently a peculiar object. The Rev. Wm. Greenwell, of Durham, in an interesting account of the opening of some barrows at Ford, in Northum-

* See *Journal of the Archæological Association*, vol. xiii., p. 299.

berland, under similar circumstances, observes,—"The facts which the first barrow discloses suggest many questions, hard perhaps to solve, but worthy of solution, and are indeed of the highest interest. Why were some bodies buried unburnt, whilst others were consumed by fire? Were the burnt bodies those of slaves or wives, killed to be ready for the chief in the land of the departed? What was the purpose of the small urn placed by the side of the corpse? Did it contain food for the use of the departed in the interval whilst he lay in the tomb? The flint arrow-head or the bronze spear, laid beside the hunter and warrior, or enclosed in the urn among the calcined bones, speak of war and the chase in other worlds, or, as some think, they tell of a purpose accomplished with the owner's death. But what mean the flint-flakes—mere shapeless chippings,—of which so many are found accompanying the old interments?

"It is probable that this custom of placing broken pot-sherds and flint-flakes in the tomb may have a religious significancy, which as yet we cannot explain. From the frequency of their occurrence, we cannot suppose them to have been accidentally deposited; and their being found associated with the dead is strong evidence of their being linked to some religious chord in the faith of these ancient people. A passage in *Hamlet* (act 5, scene 1) may have originated in a lingering remembrance of this custom, where the Priest, answering Laertes relative to the burial of Ophelia, says,—

> "'Her death was doubtful;
> And, but that great command o'ersways the order,
> She should in ground unsanctified have lodged
> Till the last trumpet; for charitable prayers,
> Shards, flints, and pebbles should be thrown on her.'"

From what I have previously stated, it would appear that *three* distinct interments had taken place in this tumulus, the most recent being that of the female—probably a Briton.

Mr. Bateman informs us that in North Derbyshire it is not an uncommon occurrence to find the Celtic tumuli taken possession of by the Saxons and Romano-British people.

In a second circular tumulus, situated at a short distance from the preceding, a skeleton in the position peculiar to Celtic interments was discovered, and a portion of the brow antler of the red deer; but no pottery or personal ornaments or implements of any kind occurred. The bones appeared to rest upon the surface of the moor, stones had been placed over it to form a cairn, and, finally, over all was heaped the soil to form the tumulus.

It will have been observed that I have not been able to describe with any degree of minuteness the precise character of the interments in the *first* of these tumuli from personal examination, as the greater portion of it had been removed with its contents previous to my arrival, and the human bones scattered about in considerable numbers on the surface of the moor. The old man, however, who had been employed by Mr. Johnson, and afterwards by myself, stated that nine skulls had been dug out comparatively perfect,* mixed with other bones, and which appeared to lie straight or at *full length;* but, as these were not the articles for which they were in search, they were broken with the spade as useless, and thrown out: which is much to be regretted, as from an examination of the fragments it is very probable both the brachycephalic and kumbe-cephalic forms of skull might have been obtained. Besides the flint implements and chippings found mixed with the bones and pottery, numerous examples, of larger size and better finish, are scattered over the moors, several of which were procured from the residents at the farm-houses known as Upper and Lower Paradise, by Mr. Fox, and presented to the Museum of the Philosophical Society.

* I picked from the bones scattered on the surface fragments of nine lower jaws, besides various portions of the skulls.

In the village of Hawnby are numerous indications of tumuli. On the estate of Mrs. Hamer, of Daleside Lodge, on Sunny Bank, there are twenty of these mounds. This locality is a sort of spur running out from the eastern side of the Hambleton Hills, and overhanging the village. It is crossed by an ancient dike, on the west side of which there is a group of tumuli, consisting of a large one in the centre of eight or nine much smaller, and has apparently been a cemetery. These have all been examined by Mr. Murray, of Daleside Lodge, and Mr. Verity, of Southwoods, and only three of them supplied any interesting results; for an account of which I am indebted to these gentlemen. The larger tumulus, to which I have just alluded, probably Anglo-Saxon, was 120 feet in circumference and four feet in height. It contained the skeleton of a young female, evidently of high rank, who, from the various decorative articles and personal ornaments which still accompanied it, might once have been a form of considerable personal attractions. At the head was a bowl of thin bronze, with three handles, about eleven inches in diameter, which had a wooden cover ornamented with strips of bronze arranged in a diamond pattern, and fastened with a bronze hasp. The wood was decayed, and the lid had fallen inside the bowl. Her waist had been encircled by a leathern girdle, of which the buckle or clasp was made of two plates of gold, one of which, worked or engraved in a cross-shaped pattern, and set with four garnet-coloured glass ornaments, still remained. These plates were riveted together by four gold rivets, leaving a space between, in which a fragment of the leather was still in its original position. Near the head were two pins, one of gold, about two inches in length, with a flat pear-shaped head, on which a design in lines was marked; the other silver, of larger size, probably a bodkin, with two holes perforated through the upper part. There were also several rings made of silver wire, the ends joining together in a

twist, blue glass beads, a portion of a knife, and several much corroded fragments of iron, a small circular stone perforated in the centre, probably the whorl of a spindle, and an oblong bronze ornament of unknown use. The body was lying with the head to the north, and the bones much decayed. The cutting edge of the front teeth were *filed* into *three points:* a singular custom, probably indicative of some peculiarity of rank or tribe to which the deceased belonged, and to which I have not seen any allusion in previous disinterments.

Dr. Barnard Davis, however, one of the learned authors of *Crania Britannica,* informs me that he has in his possession an Ashantee skull, the upper front teeth of which have been chipped to points. This is a most remarkable circumstance, as it shows that a similarity of custom has prevailed between two tribes so widely separated by time and locality, as an *Anglo-Saxon* of probably the fourth or fifth century of our era, and a native of Western Africa of the present day. The only difference is that in the Ashantee the pointing has been confined to the *upper front teeth,* and in the Yorkshire skull to the *lower.*

It is much to be regretted that the above series of personal ornaments, &c., were not retained complete. The bowl is now in the possession of Mr. Craster, of Middlesbrough, and the other articles, with the exception of the gold buckle, are in the possession of Mrs. Hamer. Of the eight smaller tumuli, only two or three were found to contain interments, or at least the remains of such. One had a skeleton with its head to the west, and the legs bent backwards in the usual position of those found in Celtic or British tumuli, but no ornaments or utensils accompanied the remains. The other tumulus, about fifteen feet from the above, was eight feet in diameter and two feet in height, surrounded with stones, and contained the skeleton of a man, lying at full length on his right side, with the head to the south. Near the thorax

was found a small circular bronze box, about two inches in diameter, with a lid, both of which are ornamented; attached to the box was a short portion of a bronze chain, two larger bronze links, a ring-shaped fibula, and a small iron knife. These objects, together with the skull from this skeleton, have been presented to our Museum by Mrs. Hamer. The skull, which is much compressed by the weight of the soil, has a narrow forehead and considerable protrusion of the jaws and teeth, and enlarged occiput: a general conformation which would lead to the supposition that it belongs to the long boat-shaped or kumbe-cephalic type of Wilson; the position of the body, however, and the different articles interred with it, are evidently not indicative of a Celtic burial, but of Anglo-Saxon.

In a third tumulus, on the Moor Ings, a spear-head or arrow-headed weapon, ten inches in length, was found. Its form is somewhat peculiar, as it is hastate or perfectly arrow-headed, but attached to a shaft of the same material, which, however, is not perfect, but appears much acted upon by time on the surface edges, from the drawing sent to me. It is described as bronze; which, however, from its corroded condition, I think may be an error.

On the Hambleton Training Ground are two flat tumuli, one on each side of the Cleave Dike, known as the Grooms' Stools. These are about 70 yards in circumference, and four feet in height. One has been opened by the Rev. Wm. Greenwell, in 1864, with what results I am not aware; and the other by Mr. Manners Verity, on the 31st of July, 1863, who found between forty and fifty flint flakes, about 18 inches from the centre. On reaching the natural surface of the moor, a little to the west, a rough flat piece of stone was discovered resting upon a bed of clay, and closing the mouth of an urn 13 inches in diameter and 12 in depth, which was sunk in the soil, and surrounded with clay mixed with charcoal and pieces

of calcined bone. The interior was half full of burnt bones and human teeth, and several fragments of a smaller urn. In the cavity below the larger urn the soil was greasy and black, also mixed with charcoal and small pieces of bone, probably the remains of cremation on the spot.

Near to the road leading from Boltby to Hawnby is a long dike or embankment, about 5 feet 6 inches in height, on the side of which, and at a spot called Silver Hill, a tumulus 64 feet in diameter and 5 feet 6 inches in height, was opened by Mr. Manners Verity and Mr. Murray, on the 15th of August, 1864. From the remains of two skeletons which occurred near the surface, it was evident it had been previously disturbed. The original interment, however, on a bed of stiff clay, was found to consist of the male skeleton of an aged individual, lying on its left side, with the knees drawn up to within 7 inches of the chin, the head bent forward, the arms crossed, so that the right hand lay on the knees, and the left in front of the pelvis. The clay under the body was black and discoloured, several stones were placed round the body, and upon one the head, which was turned to the east, rested. The whole space occupied by the entire skeleton was only about 30 inches by 24. The teeth were much worn, and amongst the bones of the left hand was a bone ring of rather small size and with an unusual horizontal projection of the same material to extend over the fingers on each side at right angles. The tumulus and the adjoining embankment exhibited parallel black lines extending through them, as if formed by layers of vegetable substances now partially carbonized. In a section of the embankment were found two long and narrow flint flakes.

At Boltby Scar, 1,075 feet above the level of the sea, and on the summit of a steep precipice, is an indication of an oblong tumulus, and two circular ones, situated within a semicircular intrenched camp, which has been protected by

a ditch, known by the name of the *Cleave Dike*, extending north and south for about two miles. These tumuli bear marks of having been previously examined, but with what success I have not been able to ascertain. From their position, however, they may probably have been the last resting-places of an early British chieftain and his family, interred within his own camp; as the site is peculiarly that of a stronghold, defended in front by the rocky declivity, and overlooking the country for many miles, by which the distant approach of any hostile force could be perceived and timely guarded against, while, by the sunken intrenchment or dike alluded to, the encampment could be equally protected from any surprise attempted by crossing the moors. There is a peculiarity in the construction of the Cleave Dike intrenchment to which my attention has been called by Mr. Verity, which consists in its being divided by the soil left standing about a yard thick across the trench, so as to form a raised partition at every three yards. These divisions are best seen in the north part of the Training Ground, adjoining Hesketh Farm; at other parts of the dike they have been more or less obliterated by the surrounding soil falling down during centuries of exposure. For what purpose have these numerous divisions been left standing? Could they have been for the safety of separate defenders along the whole line of intrenchment, like the sunk pits or earthworks in modern warfare, to command an important position? Mr. Verity suggests "that these cavities, walled in by the continuous mound of earth on both sides, and covered with wattle-boughs, might have been the rudimentary huts of this populous Ancient British village, and with the adjoining camp and tumuli made up probably what Cæsar calls their Oppida, which in this instance was a long one-sided street of defensive habitations; and as there are other lines of dike crossing the hills in different directions, they may indicate the jurisdiction of the various petty chieftains of the

Hambleton, Kepwick, and Hawnby tribes, between whom, probably, feuds would frequently take place; so that sites which are now almost deserted may have been busy scenes of savage polity in pre-Roman times."

Finally, from these several interments, we ascertain that the Hambleton Hills have been occupied by different races of men during a long series of years. The earliest, or *long barrow*, dating very probably 3,000 years since, the *circular* British barrow not less than 1,800 years; though the Rev. William Greenwell considers that 1,000 years before Christ is not too remote a period to assign for the earliest of this class, and the latest, or Saxon, from the fifth to the ninth century of our era.

ON THE PLEISTOCENE MAMMALS OF YORKSHIRE. BY WM. BOYD DAWKINS, M.A. (OXON.), F.G.S., ETC. *(An abstract only).*

In examining with some care the remains of animals embedded in caverns, peat mosses, river beds, and other early deposits, we find them indicate or point to distinct and widely-separate periods of time since their entombment. Some of the animals are still living in the district, and others of an earlier date no longer occur in Britain, but whose former existence is recorded in the early annals of this country. Another class embrace species, in addition, of which we have no record of their ever having been natives of Europe. To the first we apply the term *Prehistoric;* to the last, *Pleistocene,* which is synonymous with the terms *Post-Pliocene, Preglacial,* and *Glacial.* It applies to all deposits or formations, from the top of the Norwich Crag up to the prehistoric deposits comprising the preglacial, the forest-bed, the glacial drift, the post-glacial brickearths, loams, gravels, and the contents of the older ossiferous caverns. In some instances, species of animals appear to have lived through the earliest of these periods down to the present time; while others ceased to exist at a very remote epoch, and whose bones are either

embedded in river deposits or caverns in the limestone districts, which, in many cases, owe their formation to the action of underground currents of water from streams or the accumulation of springs, while the majority of caverns owe their contents to the falling of animals into open fissures and the transporting power of water: others, again, have been inhabited for ages by wild animals, and filled with the remains of their prey. The fissures, or old swallet holes, are in many instances still open, and more or less erect; and farmers will tell you that they have lost sheep, horses, oxen, and dogs, that had no means of regaining the surface. In caverns, however, which have afforded shelter from the weather, man and wild animals have resorted from the Pleistocene times to the present day; hence in such localities remains of different epochs are found. As in Kent's hole, for instance, where, overlying the mass of bones dragged in by hyænas in Pleistocene times, and sealed down by stalagmite, a layer of dark-coloured earth, containing various implements of bone, flint, and pottery, and exhibiting upon its surface the indications of the feasts and fires of some early race of people. The Kirkdale cave, in this county, contained several Pleistocene mammals intermixed with those of our own day. The Paviland cave, again, exhibited a mixture of Pleistocene and Prehistoric remains; while, in other instances, those of Prehistoric age only are met with. The old river gravels, loams, and brickearths, which are sometimes very high above the level of the nearest stream, are the result of the erosion of the rocks during the formation of the valleys by the ancient rivers flowing at a far higher level than at present, which has cut down their beds to the present level, so that the remains from the caverns and the river deposits are, geologically speaking, of the same date. Some of these deposits are of vast antiquity, and contain the remains of the extinct mammals that inhabited Yorkshire, and happened

to be swept down by the floods. From these two sources the following Pleistocene mammalia have been obtained in Yorkshire :—

Kirkdale.	Caverns.		River Deposits.	
	Kirby Moorside.	Kirkdale.	Bielbecks.	Leeds.
Felis spelæa	×	×	×	—
Hyæna spelæa	×	×	—	—
Canis lupus	—	×	×	—
Canis vulpes	—	×	—	—
Mustela erminea	—	×	—	—
Ursus spelæus	—	×	—	—
Ursus Arctos	—	×	—	—
Bos primigenius	—	—	×	—
Bison priscus	—	×	×	×
Megaceros Hibernicus	—	×	—	—
Cervus elaphus	—	×	×	—
Cervus tarandus	—	×	—	—
Elephas antiquus	—	×	—	—
Elephas primigenius	—	—	×	×
Hippopotamus major	—	×	—	×
Equus fossilis	—	×	×	—
Rhinoceros leptorhinus (Owen)	—	×	×	—
Arvicola amphibia	—	×	—	—
Arvicola agrestis	—	×	—	—
Lepus timidus	—	×	—	—
Lepus cuniculus	—	×	—	—
Mus musculus	—	×	—	—

To this list Professor Owen would add the Bos longifrons and the Woolly rhinoceros (Rhinoceros tichorhinus); but a careful examination of the remains ascribed to these animals in the museums of York, Oxford, and London, has convinced me that they belong respectively to the bison and the Leptorhine rhinoceros. Amounting in all to 22 species, which is nearly half of the entire number of Pleistocene mammalia whose remains have been found in Britain. These fall into five distinct groups. The first comprehending all the extinct species; the second, those confined at the present day to northern climates; the third, those confined to southern; the fourth, those common to northern and tropical climates; and, lastly, those still inhabiting the temperate zones of Europe.

1st. *The Extinct Species.* Out of the 53 species proved to have inhabited Pleistocene Britain, but 14 are no longer to be found on the face of the earth:—

Machairodus latidens.	Elephas meridionalis.
Ursus spelæus.	Hippopotamus major.
Megaceros Hibernicus.	Rhinoceros tichorhinus.
Cervus dicranios.	Rhinoceros megarhinus.
Elephas antiquus.	Rhinoceros leptorhinus.
Elephas primigenius.	Rhinoceros etruscus.
Elephas priscus.	Castor trogontherium.

2nd. *Species confined to Northern Climates.* This group of Pleistocene mammals is now confined to the colder regions of the north, or the high altitudes in the northern hemisphere, where a low temperature obtains, and consists of eight:—

Gulo luscus.	Spermophilus citillus.
Cervus tarandus.	Spermophilus erythogenoides.
Alces malchis.	Lagomys spelæus.
Ovibos moschatus.	Lemmus.

3rd. *Species confined to Southern Climates.* This group consists of only two:—

Felis spelæa, variety of Felis leo.
Hyæna spelæa, variety of Hyæna crocuta.

4th. *Species common to Cold and Tropical Climates.* The Felis antiqua, or fossil representative of the leopard (Felis pardus), extend, at the present day, throughout Africa and Persia into Siberia. The fox and the wolf are other instances of some of the living carnivora being able to endure almost every degree of temperature without being specifically modified by it.

5th. *Species still Inhabiting the Temperate Zones of Europe.* This is the largest group of Pleistocene mammalia, and embraces 28 species which are still living in the temperate zones of Europe:—

Homo.	Canis lupus.
Rhinolophus ferrum-equinum.	Canis vulpes.
Vespertilio noctula.	Mustela erminea.
Talpa vulgaris.	Mustela putorius.
Felis catus ferus.	Mustela martes.

Lutra vulgaris.	Sus scrofa ferus.
Meles taxus.	Equus caballus.
Ursus Arctos.	Castor Europæus.
Sorex vulgaris.	Arvicola amphibia.
Sorex moschatus.	Arvicola agrestis.
Bos primigenius.	Arvicola pratensis.
Bison priscus.	Lepus timidus.
Cervus elaphus.	Lepus cuniculus.
Cervus capreolus.	Mus musculus.

This analysis, therefore, of the 53 Pleistocene species gives—

14 as extinct.
8 confined to northern climates.
2 as confined to southern climates.
1 as common to temperate and hot climates.
28 as still inhabiting the temperate zones of Europe.

53

The inference drawn from the first of the above lists of mammalia, as regarding the physical conditions and the climate of Yorkshire, at the time they lived in the county, is highly important and interesting. Again, the proportion of 14 extinct to 39 living species proves that, in the geological sense, the present order of things is separated by a small interval from the Pleistocene; while, from the fact that half are still living in the same European area, we may infer that the conditions of existence, the climate, and food, and the like, were then very similar to those now obtaining in the area in which we live.

That, however, some great physical change has taken place in Europe since the Pleistocene times, is proved by the presence of other groups of mammalia—those confined now to cold and to hot climates. They afford evidence that at first sight appears conflicting, but which, upon analysis, we find to be very conclusive, that the climate in Britain in those days was very much more severe than at present. From the conditions under which the surviving Pleistocene herbivores now live, we can infer those under which they lived in Britain in that early period. The Northern group of Pleistocene mammalia, living only now in a severe continental

climate, consists of species that have very different powers of resisting cold and heat. Thus the musk sheep is found now only under the lowest temperatures in the vast treeless, barren grounds of North America, while the reindeer lives also in the forests, along with the elk of the Europæo-Asiatic and North American continents. The red deer and the bison range up to the edge of the province inhabited by the other animals. The lemmings live under a very severe climate, while the marmots are found in the higher and colder districts in Southern Europe and Central Asia. Each of these Northern species is dependent upon the oscillation of the climate for its particular habitat in a given year, retreating northward or southward according to the temperature that regulates the supply of food necessary for its existence. By some such oscillation of temperature the remains of the animals of two contiguous zoological provinces may be found together in one spot, as in the case of the northward retreat of the musk sheep, from the neighbourhood of Fort Churchill, where it once lived, and which is now occupied by the elk and waipiti. In this manner the admixture of the remains of animals living at the present day, respectively in a severe and in a temperate continental climate, may be accounted for in the Pleistocene caverns and brickearths.

The hypothesis of a series of conditions obtaining in Pleistocene Western Europe, similar to those now found in some portions of Northern Asia, is necessary to complete the evidence afforded by the fauna, and the deposits in which they are found. Now, the contortion of the gravels, and the angular state of the pebbles of which they are often composed, are, as Mr. Prestwich infers, explicable only on the theory of ice having been found in our rivers in far larger quantities than at the present day—the one being the result of the grounding of miniature bergs, the other of the melting away and depositing their burden of pebbles. The large

plateaux of brickearths are probably the deposit of the floods caused by the sudden melting of the winter snow, similar to that which takes place in Northern Siberia and in the area north of the Canadian lakes. The winter cold would be sufficiently intense to allow of the Northern groups of mammalia living in the winter; and the musk sheep might have been obliged to leave the Pleistocene "tundras," and take shelter in the zone of the elk, and even the bison, in an unusually severe season. On the other hand, in the summer, the animals that are now found in the temperate zones of Europe might advance even into the country of the elk and the reindeer; and even carnivora, now confined to hot climates, find their way into the temperate zone of the day. Thus the Hyæna vulgaris, or common living hyæna, is found fossil in the South of France, without penetrating as far north as Britain, France, or Germany. In fact, the evidence afforded, both by the fauna and deposits of the Pleistocene, seems to us to prove that the climate in Pleistocene Britain was more severe than it is now; that at a time when Britain formed a portion of the Europæo-Asiatic continent it more closely resembled that now obtaining in the fur countries of Northern Asia than elsewhere; and, lastly, that it was subject to oscillation, by which the migrations of the herbivores were directed northward or southward, as the case may have been. Strong evidence is afforded by the thick woolly covering of the carcases of certain larger pachyderms —as the Mammoth and Tichorhine rhinoceros of Siberia— that the temperature of the countries in which they resided was very severe. The Hippopotamus major, also, which was cotemporary, *may* have been, in like manner, supplied with warm covering; but of this fact we have no proof, and the aquatic habits of this last mammal militate somewhat against this supposition, and are apparently incompatible with a climate suited to the reindeer and other terrestrial mammals confined to cold climates.

Again; as its remains have never been found in high northern latitudes, it may more probably have been only a periodical visitor in England, France, and Germany, and not a dweller throughout the year, like other herbivores—as the elephant, rhinoceros, Irish elk, bison, reindeer, and its head-quarters have been confined to the shores of the Mediterranean and the north of Africa, where its remains have occurred near Constantine, in Algeria. Again, the occurrence of the hippopotamus may be accounted for in a somewhat different manner; for instance, as it appears self-evident that the general climate of Britain, during the post-glacial epoch, has been more severe than at present, a period or periods of some length may have intervened, while England and Ireland formed a portion of the European continent, when the climate may have been less severe, and the rivers free from ice throughout the year. This inference is somewhat strengthened; but the fact that the remains of the hippopotamus are most frequently associated with those species of elephant and rhinoceros—*i.e.*, Elephas antiquus and Rhinoceros leptorhinus—which not only occur in this hemisphere, but have had a southern or tropical, rather than a northern range; and as certain plants belonging to the Lusitanian flora are found on the west coast of Ireland, it is only reasonable to suppose that their migration from a southern land has occurred along a coast line since the glacial epoch, which would have exterminated them by its severity. Is it not probable, therefore, that at the period which favoured the migration of the flora, certain southern forms of mammals have migrated also?

The evidence of a gradual increase of temperature in France and Germany during the Historical period appears perfectly certain. From Diodorus Siculus we learn that the Rhine and the Danube, during the first four centuries, were frequently frozen over in the winter; and Cæsar mentions

the reindeer as existing in the great Hercynian forest that overspread Northern Germany, along with the gigantic urus and the elk. This statement is singularly corroborated by the discovery in the peat bogs of Pomerania, according to Professor Nilsson, of the remains of these three animals; so that there can be no doubt of his accuracy in this particular instance. From some cause or other the temperature has increased on the banks of the Rhine; and from the fact that the reindeer cannot live, at the present day, south of the Baltic, we may recognize a proof of a diminution of cold in that region since it was inhabited by those of a severe climate. This change of temperature is very generally accounted for by the drainage of morasses and the cutting down of woods; but may it not, with more probability, be ascribed to a much deeper cause—to a secular change operating throughout Europe, which began in the Pleistocene, and was going on throughout the Prehistoric, and happened, incidentally, to be noticed, as we have seen, in Historical periods? The presence of the reindeer in the Prehistoric deposits of England, Ireland, and Scotland, affords precisely the same evidence as those mentioned by Cæsar, as at the time they lived in Britain and Ireland the climate must have been suited for them. There may have been oscillations of temperature, but the progress, on the whole, seems to have been gradual, from the intense cold of the glacial period to the temperate "insular climate" obtaining in Britain at the present day. In conclusion, I most earnestly recommend a careful and minute examination of the contents of the Prehistoric and Pleistocene caverns which occur in the mountain limestone districts of this county, as from such details much important information may, doubtless, be added to our knowledge of the former inhabitants of Pleistocene Yorkshire.

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